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SOUTHWEST FISHERIES CENTER
HONOLULU LABORATORY
2570 DOLE STREET
HONOLULU, HAWAII 96822-2396
NATIONAL MARINE FISHERIES SERVICE

May 1992

FISHERY STATISTICS OF THE WESTERN PACIFIC

VOLUME VII

Territory of American Samoa (1990)

Commonwealth of the Northern Mariana Islands (1990)

Territory of Guam (1990)

State of Hawaii (1990)

Compiled by

David C. Hamm, Robert S. Antonio, and Michael M. C. Quach

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ADMINISTRATIVE REPORT
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Southwest Fisheries Science Center
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PREFACE

In recent years, the demand for data and information concerning marine fisheries has greatly increased. To help meet these increased needs in the central and western Pacific areas, the National Marine Fisheries Service's Southwest Fisheries Center initiated the Western Pacific Fishery Information Network (WPACFIN), which assists Pacific island fisheries agencies in upgrading their data collecting, processing, and reporting capabilities. Several agencies are participating in this program: the National Marine Fisheries Service's Southwest Fisheries Center and its Honolulu Laboratory, and the Southwest Region and its Western Pacific Program Office, American Samoa's Department of Marine and Wildlife Resources, the Commonwealth of the Northern Mariana Islands' Division of Fish and Wildlife, Guam's Division of Aquatic and Wildlife Resources, Hawaii's Division of Aquatic Resources, and the Western Pacific Regional Fishery Management Council.

In 1982, these agencies formed a Fisheries Data Coordinating Committee (FDCC) and a FDCC Technical Subcommittee to help guide, coordinate, and monitor all of the many activities being undertaken by each agency to improve their systems. Significant progress has been made by all participating agencies, particularly in the areas of upgrading data collecting and processing systems.

As a major step in improving and coordinating the data reporting and distributing systems of the agencies, in May 1985, the FDCC agreed to begin producing a combined document reporting each island's major fisheries statistics. Production of the document would be the responsibility of the FDCC Technical Subcommittee and would be coordinated by the WPACFIN program manager. Each agency would supply required summaries, graphs, and text for its respective chapter of the report; WPACFIN would combine the chapters and distribute the document as part of the Administrative Report Series of the Southwest Fisheries Center.

This document is the seventh volume in the series "Fishery Statistics of the Western Pacific" and contains summaries of commercial and creel survey fishery landings data for 1990 for American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and Hawaii. The first six volumes of this series contained similar reports for these areas for 1979 through 1989.

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BACKGROUND

This report has been compiled by governmental fisheries agencies of several islands in the central and western Pacific area in a cooperative and continuing effort to improve the availability and dissemination of fisheries information. The data contained herein have been collected, computerized, edited, and processed by agencies participating in the Western Pacific Fishery Information Network (WPACFIN), including American Samoa's Department of Marine and Wildlife Resources (DMWR), the Commonwealth of the Northern Mariana Islands' (CNMI) Division of Fish and Wildlife (DFW), Guam's Division of Aquatic and Wildlife Resources (DAWR), Hawaii's Division of Aquatic Resources (HDAR) and the Southwest Fisheries Center's (SWFC) Honolulu Laboratory, National Marine Fisheries Service (NMFS). The data summaries and graphs contained in this document were prepared by WPACFIN staff at the Honolulu Laboratory from data collected by WPACFIN or provided by these agencies. Data from DMWR, DFW, and DAWR were supplied on floppy diskettes in established WPACFIN data base formats, whereas data on the Guam commercial fisheries were collected on forms provided to fish wholesalers by WPACFIN. Data for Hawaii were provided by HDAR on computer tape. Once data from all of these agencies were put into the proper format on the central WPACFIN computer and appropriate edit and verification procedures completed, summary reports and files were produced using software developed specifically for this purpose. Graphs were produced using commercially available software and a lazerjet printer.

PROGRESS

In 1981, when WPACFIN began assisting agencies in improving their data collecting and processing systems, only the State of Hawaii had computerized processing. By mid-1982, fisheries offices in American Samoa, Guam, and the CNMI had implemented computerized processing on microcomputers supplied by WPACFIN. Since that time, these agencies have made many significant improvements to their data collecting systems and have established sound automated data processing systems. Most agencies can now provide fishery statistics to WPACFIN within 45 days of the date of collection. The HDAR has also improved its systems in recent years and has significantly reduced the lag time in data processing from about 2.5 years to less than 1 year. It has also improved the procedures used for editing, updating, and processing Hawaii's data. Implementation of additional planned improvements could reduce the lag time to about 6 months.

PRECAUTIONS

Data collecting and processing systems vary greatly among Pacific island fisheries agencies. Although much standardization has taken place and is continuing, there remain many unique aspects of each island's systems based on local needs and capabilities. When using summaries contained in this report, especially if making comparisons, one should keep in mind the nature of the systems used to produce the data. For instance, Hawaii's data are based on mandatory monthly reporting by licensed commercial fishermen, CNMI's data are based on voluntary monthly reporting of fish buyers using government- provided invoices, Guam's data are from WPACFIN-sponsored voluntary reporting by major commercial dealers and DAWR- operated creel survey sampling and data expansion programs, and American Samoa's data are based on an integration of almost daily interviews of fishermen and a creel survey and data expansion program similar to Guam's. Each system has advantages and disadvantages, and the user should be aware of them when comparing or interpreting data.

The user should also be aware that species assemblages vary among island groups, as do cultural preferences and principal fishing techniques. Population size is of particular importance when making interpretations of the relative value and importance of the fisheries. To help the user make these value judgments, more detailed explanations of the data collecting and processing systems are provided in each island's section of this report.

CONTENTS

This document is divided into sections by island group. Each section contains reports on the monthly and annual landings by species or species groups for the commercial fleet. The sections for American Samoa and Guam also contain estimates of total catch and effort of all fisheries including recreational and subsistence fishing activities. These estimates and their associated confidence limits were generated by computer-based data expansion systems using sample fishery data collected by creel survey programs. Commercial landings for American Samoa were calculated based on information gathered during the offshore creel survey sampling program. Two sets of annual summaries are included for Hawaii, one each for commercial landings that were sold and not sold.

Definitions

In addition to the description of the systems and the monthly and annual reports, each section contains graphs of some of the summary fishery statistics of particular interest or importance to participating WPACFIN agencies. For purposes of graphical presentation of the data, several categories have been defined for each island's fisheries. Because of differences in

reporting systems and capabilities among the islands, species contained within each category may vary, but all categories are documented in each island's section. Overlap exists among some of the categories used for different graphs. Categories used in the graphs include the following:

1. Fisheries Categories - These are combinations of species of similar ecological types, specifically, pelagic, bottom fish, reef fish, and "other." "Other" includes groups that generally traverse these categories, such as sharks and certain jacks, or are not typically included in these groups, such as mullet and milkfish.

2. Pelagic Management Unit Species (PMUS) - Defined in the Fishery Management Plan for pelagic species to include the billfishes, wahoo, mahimahi, and sharks.

3. Bottom Fish Management Unit Species (BMUS) - Defined as the species of initial importance in the Fishery Management Plan for bottom fish and seamount fisheries, including the major deepwater snapper, grouper, emperor, and certain jacks.

4. Tunas - Predominantly skipjack and yellowfin tunas in all areas, but also including most other tuna species and excluding wahoo.

5. Other Tunas - All tunas as defined above, but excluding skipjack and yellowfin tunas.

6. Billfish - Combination of all marlin, sailfish, spearfish, and swordfish species.

7. Other Methods - In the American Samoa and Guam sections, fishing methods other than trolling and bottom fishing are combined into this single "other" category for certain graphs.

Graphics

A minimum of four types of graphs are provided with each island's data. The chapters for American Samoa and Guam have an additional type of graphics on catch and effort from their creel survey data. Type I graphs present summary charts of the major species and species groups for 1990. Type II graphs are seasonality plots for the major species or species groups, showing the average weight landed during each month for all years combined. Type III graphs are based on annual summary statistics and help visualize the variability among years. Type IV graphs are plots of monthly landings of some of the major commercially important species and document fluctuations in landings of these species over the entire time series. Type V graphs are based on creel survey data and include plots of catch and effort by

fishing method plus a combination of several of the types I-IV graphs.

I. Monthly graphs for each year's data including:

- A. Major fisheries categories
- B. Tunas, PMUS, and BMUS
- C. Wahoo, mahimahi, and billfish
- D. Skipjack, yellowfin, and other tunas

II. Plots of average monthly landings for:

- A. Tunas, PMUS, and BMUS
- B. Wahoo and mahimahi
- C. Billfish species:
  1. Marlin and sailfish - American Samoa and CNMI
  2. Blue marlin, black marlin, and striped marlin - Hawaii
  3. Sailfish, shortbill spearfish, and swordfish - Hawaii
- D. Skipjack, yellowfin, and other tunas
- E. BMUS and the most important bottom fish species
  1. BMUS, ehu, and onaga - American Samoa
  2. BMUS, emperor, and grouper - CNMI and Guam
  3. BMUS, onaga, and opakapaka - Hawaii
  4. BMUS, ehu, and uku - Hawaii

III. Graphs of annual summary statistics for:

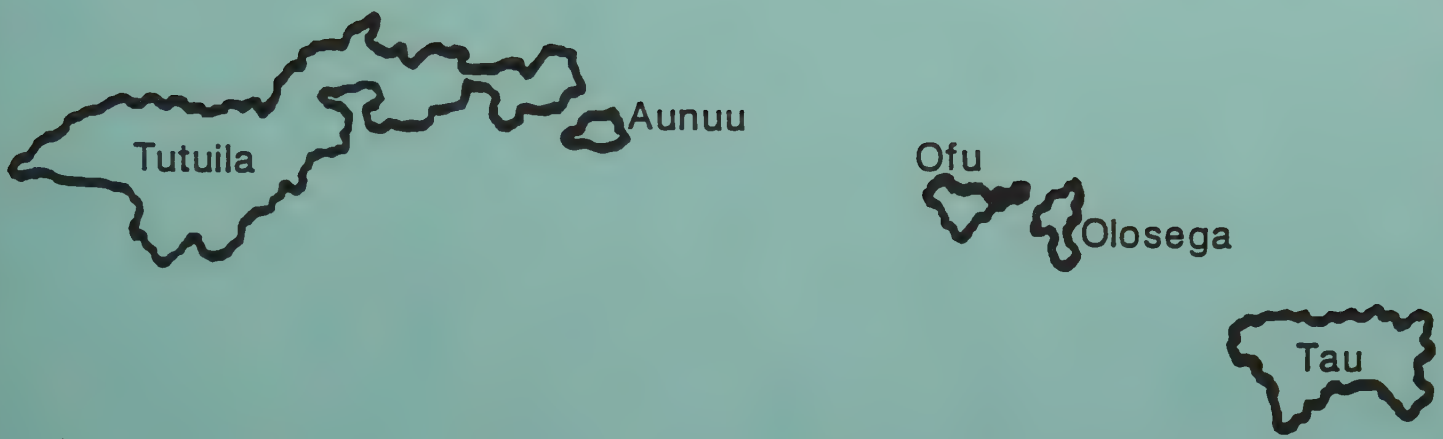
- A. Major fisheries categories
- B. Total commercial landings - pounds and dollars
- C. Tunas, PMUS, and BMUS
- D. Wahoo, mahimahi, and billfish
- E. Skipjack, yellowfin, and other tunas

IV. Graphs of monthly landings over the entire time series for the following major species:

- A. Wahoo - All four areas
- B. Mahimahi - All four areas
- C. Blue marlin - All four areas
- D. Black marlin - Hawaii
- E. Striped marlin - Hawaii
- F. Sailfish - American Samoa, Guam, and Hawaii
- G. Shortbill spearfish - Guam and Hawaii
- H. Swordfish - Hawaii
- I. Skipjack tuna - All four areas
- J. Yellowfin tuna - All four areas
- K. Opakapaka - Hawaii
- L. Onaga - American Samoa and Hawaii
- M. Uku - Hawaii
- N. Ehu - American Samoa and Hawaii
- O. Emperors - CNMI and Guam
- P. Grouper - CNMI and Guam

V. Graphs of certain statistics generated by creel surveys for American Samoa and Guam

A. Offshore monthly catch by method
B. Offshore monthly effort by method
C. Offshore annual catch by method
D. Offshore annual effort by method
E. Inshore Total Catch and Effort
F. Offshore and Inshore Total Catch



American Samoa

Fishery Statistics 1990

AMERICAN SAMOA 1990 FISHERY STATISTICS

Compiled by

American Samoa
Department of Marine and Wildlife Resources
and the
Western Pacific Fishery Information Network

May 1992

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AMERICAN SAMOA 1990 FISHERY STATISTICS

INTRODUCTION

American Samoa (approximately lat. 14° S, long. 170° W) is composed of the major island of Tutuila, where about 87% of the total population of 35,000 live; Aunu'u, a small island less than 1 mile off Tutuila's southeast shore; the Manu'a Islands of Ofu, Olesaga, and Ta'u, located about 105 km (65 miles) east of Tutuila and having about 4,300 residents; the uninhabited Rose Atoll, some 290 km (180 miles) east of Tutuila; and Swain's Island about 350 km (220 miles) north of Tutuila, where approximately 20 people live. The American Samoa Department of Marine and Wildlife Resources (DMWR), formerly the Office of Marine Resources, located in Pago Pago on Tutuila, has been collecting commercial fisheries data from the local fleet on Tutuila since the early 1970's and from the Manu'a Islands since 1983. Most data collected over the years have been from the commercial fleet, but beginning in October 1985, DMWR's data collection programs were modified to include data on recreational and subsistence fisheries as well.

The domestic fisheries of American Samoa are typically small boat, one-day fisheries. Although one domestic longliner operated for a few years, the majority of the fleet is composed of two types of 28- to 29-foot outboard engine powered catamarans called alias and manta cats. During 1990, 43 boats were sampled, 35 from Tutuila and 8 from the Manu'a Islands. Fishing is mostly done by trolling and bottom fishing methods, and the majority of the catch is sold locally, but some is exported to Hawaii. During 1990, on average, trips on boats from Tutuila had three-man crews, fished 9 hours, and caught a little over 172 pounds of fish.

DATA COLLECTING SYSTEM

The major method used by DMWR for obtaining catch statistics has always been interviewing fishermen at the end of their trips. Before October 1985, the DMWR data collectors kept records of as much commercial fishing activity as possible and routinely obtained interviews from fishermen as often as possible. This method of data collection provided accurate data on the commercial fleet for the trips where interviews were conducted, but was very labor intensive, did not cover all trips, and intentionally excluded the recreational and subsistence fisheries. Therefore, in October 1985, a new sampling program was implemented on Tutuila to provide better coverage and statistics for all boat-based fisheries. The new sampling methods were not implemented in the Manu'a Islands because the fishing fleet is centrally located and is small enough that statistics were being collected for nearly every trip.

The new sampling program for Tutuila was based on a survey design that had been used in Guam for about 4 years. This systematic, random sampling program stratifies sampling by type of day, either weekday or weekend-holiday. For the new program, DMWR staff normally sample 2 weekdays and 1 weekend-holiday per week. In addition, they obtain as many interviews as possible on their "off days" to maintain as much overall coverage of the fisheries as possible. During official survey days, counts of total participation are collected to facilitate expansion of the survey data to estimates of total catch and effort for Tutuila. Unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. Tutuila is divided into six areas, five of which are sampled. Presumably, fishing activity and success rate of boats in the non-sampled area are similar to those in the sampled areas. Further assumptions are that information given by the fishermen during the interview is accurate and that the fishermen interviewed are representative of the entire fishing population.

Survey data are collected in the field on interview log sheets and returned to the DMWR office for editing. The following information is collected for each interview:

* Date
* Type of day
* Time
* Boat name
  Captain or boat owner's name
* Method of fishing
* Disposition of catch
* Species caught
  Number of pieces for each species
* Weight in pounds for each species
  Price per pound for each species
  Area fished
* Home island
  Number of trips since last interview
* Total trip weight in pounds
  Total hours fished (trip length)
  Number of fishermen
  Number of gear used

It is not always possible for the interviewer to obtain information on all items listed. However, the ones marked with an asterisk (*) are considered essential for data expansion purposes. The "TIME" field is used to distinguish between interviews collected on survey days versus "off days." Only data collected on official survey days are used in the data expansion process. Identification and weight of each species are often not obtainable; in which case, a code for species groupings (e.g., miscellaneous bottom fish) is used.

DATA PROCESSING SYSTEM

Interview forms are returned to the office, edited, coded, and entered into computerized databases--the commercial landings database for data collected before October 1985, and the offshore creel survey database for data collected since then. Edit and summary reports are produced to help verify that the data were entered correctly. The creel survey databases are then translated into standard record formats to be used by the American Samoa Offshore Expansion System (ASOES), programmed by WPACFIN specifically for DMWR. As data are converted into ASOES formats, additional error checks are performed by the computer to make sure only valid information enters the expansion system. The ASOES is a menu-driven system that steps the user through a series of processes that summarize creel survey data to produce catch and effort expansion and species composition files and reports. Typically 1 month of data is processed at a time, although the system allows for processing broader time increments of data.

The expansion system generates estimates of daily catch, effort, and participation for each fishing method. These daily estimates are considered measurements of the Tutuila fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan being expanded, and multiplied by proportionality constants that adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. Percent species composition by weight is calculated from the sampled catch and used to create estimates of total landings by species by multiplying the sampled percent by the expanded estimated catch. All steps in the expansion process are stratified by fishing method. The ASOES produces reports and files of the final totals for all important catch and effort statistics. These files are later used to produce the reports contained in this document. On a quarterly basis, copies of the DMWR data bases are sent to the Honolulu Laboratory for updating the central WPACFIN files.

At the Honolulu Laboratory, the data are translated into different formats and transferred to the central computer for further editing, verification, and processing before generation of summary reports. Because DMWR changed their data collecting systems during 1985, new processing procedures were established by WPACFIN to standardize reports as much as possible to facilitate comparisons between years. Data collected before October 1985 were adjusted upward by the percent coverage to account for missed trips. The offshore creel survey data collected since October 1985 were expanded to estimates of total Tutuila landings using ASOES and then separated into commercial versus noncommercial landings (e.g., sold versus not sold). The expansion and separation algorithms stratify the data by fishing

method to improve the final estimates of landings by species. After the file of estimated commercial landings for Tutuila was created from the ASOES files, the adjusted commercial landings for Manu'a were added to it, thereby creating the commercial landings data base for American Samoa. Additionally, because price information was not obtained for all landings that were sold, the commercial data were edited to create price information when none was available. To accomplish this, a three-tiered editing system was designed to "create" price estimates based on the best information available. The edit system puts average price information in each record where it is missing, based on the following three levels of available information:

1. If price information is available for the same species in the same month, the weighted average price per pound is written into all records missing that information for that species and month.

2. If no price information is available for the same species and same month, the annual weighted average price for that species is written into records for that species and month.

3. If no price information is available for a species for the entire year, the program prompts the user for input and updates the file based on the response.

As data base records are updated, each is flagged to indicate which level of estimation was used for the price information. This makes it possible to easily exclude the "created" data, if desired, when doing economic analysis.

DATA REPORTING SYSTEM

After all editing, quality control, and other processing activities are completed on the central WPACFIN computer, monthly and annual commercial landings reports by species are generated. Each of the commercial landings reports contains the common name, weight in pounds, value in dollars, and the average price per pound of each species or species group. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total estimated commercial landings for each species and for all species combined for the calendar year.

Estimated total landings reports are provided separately for Tutuila and Manu'a. Monthly and annual estimated total landings reports are provided for the Manu'a Islands. Two types of total landings reports are included from the creel survey data expansion system, ASOES, for Tutuila: catch and effort expansion reports and species composition reports. These reports were produced by using the expansion and species composition files

created by ASOES as input to utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from ASOES files to improve the presentation of data and reduce the amount of space required to report the important statistics. Monthly and annual estimated total landings reports for 1990 include the expansion summary of catch and effort statistics by fishing method and the summary species composition reports for all methods combined.

Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual report will not equal the total obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). The annual species composition report was created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of annual percent species composition based on greatly increased sample size.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort, in boat hours. In the offshore expansion reports, the boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total count. A CV is included for each statistic in the expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either weekdays or weekend-holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither type of day had

sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the fishing methods, the totals for the month are questionable.

In fisheries applications, calculation of catch per unit of effort (CPUE) may be done in several ways. In the ASOES expansion reports, average monthly CPUE is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each fishing method. The average monthly CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation. Therefore, the CPUE provided in the monthly and annual expansion reports will not be equal to the catch divided by the effort as presented in those reports.

The following species, species groups, and abbreviations are used in the tables and graphs of American Samoa's data:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Blue marlin
Black marlin
Sailfish
Shortbill spearfish
Wahoo
Sharks

II. Bottom Fish Management Unit Species (BMUS)

Jacks (unclassified)
Black jack
Amberjack
Giant trevally
Bottom fish (unclassified)
Groupers (unclassified)
Blacktip grouper
Lunartail grouper
Snappers (unclassified)
Bluelined snapper
Gray jobfish (uku)
Deepwater bottom fish (unclassified)
Yellow opakapaka

II. Bottom Fish Management Unit Species (BMUS) (cont.)

Hawaiian opakapaka
Opakapaka
Gindai (flower snapper)
Yellowtail snapper
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Ehu (red snapper)
Emperorfish (unclassified)
Ambon emperor
Redgill emperor

III. Billfish

Blue marlin
Black marlin
Sailfish
Shortbill spearfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth tuna
Albacore
Bigeye tuna
Kawakawa

V. Other Tuna

The above tuna species excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
- Troll fish (unclassified)
- Barracuda
- Rainbow runner

B. Bottom Fish

All BMUS plus the following:
- Bigeye trevally
- Bluefin trevally
- Goldspot trevally
- Trevally
- Whitemouth trevally
- Peacock grouper
- Flagtail grouper
- Tomato grouper

B. Bottom Fish (cont.)

Yellowspot grouper
Striped grouper
Spotted grouper
Small mouth grouper
Giant grouper
Rufous snapper
Blacktail snapper
Onespot snapper
Twinspot/red snapper
Humpback snapper
Blood snapper
Brown snapper
Bluelined gindai
Black snapper
Stone's snapper
Kusakar's snapper
Bigeye emperor
Goldenline bream
Longnose emperor
Bluelined bream
Orangespot emperor
Snake mackerel
Oilfish

C. Reef Fish

Reef fish (unclassified)
Mullet
Rabbitfish
Surgeonfish and tangs (unclassified)
Lined surgeon
Yelloweyed surgeon
Convict tang
Dussumier's surgeon
Spotted surgeon
Unicornfish
Squirrelfish (unclassified)
Berndt's soldierfish
Bigeye squirrelfish
Parrotfish
Terapon perch
Wrasse
Goatfish (unclassified)
Pink goatfish
Inshore groupers (unclassified)
Triggerfish
Butterflyfish
Porcupinefish
Inshore snappers (unclassified)

D. Other

Miscellaneous
Bigeye scad
Rays
Eels
Invertebrates (unclassified)
Crabs (unclassified)
Kona crab
Mangrove crab
Spiny lobster
Slipper lobster
Shrimp
Octopus
Squid
Clams
Turtle

INTERPRETATION OF STATISTICS

The user is reminded to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all the fishing activities, but on samples of those activities. One of the major factors in expanding the creel survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on the fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen. The estimates of total landings are considered to be conservative because the inshore fisheries are currently not included in DMWR's sampling programs. However, WPACFIN has developed the basic design for inshore sampling and data expansion systems, and DMWR plans to implement them when resources become available.

Table II.1.1

American Samoa 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad	85	140	1.65
Jacks	438	697	1.59
Black jack	439	736	1.68
Amberjack	4	8	2.00
Barracudas	274	307	1.12
Large barracuda	80	80	1.00
Small barracuda	534	876	1.64
Sharks	56	70	1.25
Bottom fish	506	839	1.66
Groupers	72	119	1.65
Peacock grouper	207	331	1.60
Flagtail grouper	58	95	1.64
Tomato grouper	68	107	1.57
Yellowspot grouper	33	65	1.97
Spotted grouper	17	25	1.47
Lunartail grouper	833	1,459	1.75
Blue lined snapper	2,482	4,087	1.65
Rufous snapper	25	42	1.68
Twinspot/red snapper	25	31	1.25
Humpback snapper	508	860	1.69
Brown jobfish	40	50	1.25
Gray jobfish	1,221	1,972	1.61
Deepwater bottomfish	20	40	2.00
Hawaiian opakapaka	82	123	1.50
Opakapaka	30	46	1.53
Gindai (flower snap)	296	474	1.60
Yellowtail snapper	6	10	1.67
Lehi (silverjaw)	69	114	1.65
Onaga (red snapper)	169	314	1.86
Ehu (red snapper)	486	813	1.67
Black snapper	16	26	1.63
Emperors (misc)	134	222	1.66
Longnose emperor	1,321	2,195	1.66
Ambon emperor	516	905	1.75
Blueline bream	34	56	1.65
Redgill emperor	1,891	3,142	1.66
Snake mackerel	64	64	1.00
Oilfish	26	43	1.65
Rudderfish	29	43	1.48
Lined surgeon	563	846	1.50
Yellow eyed surgeon	397	598	1.51
Spotted surgeonfish	135	203	1.50
Unicornfish	873	1,317	1.51
Squirrelfish	131	223	1.70
Saber squirrelfish	5	10	2.00
Parrotfish	792	1,179	1.49
Triggerfish	29	47	1.62

Table II.1.1(cont.)

Species	Pounds	Value	$/lb
Butterflyfish	25	37	1.48
Dolphin (mahimahi)	1,955	2,286	1.17
Blue marlin	1,033	1,039	1.01
Rainbow runner	130	216	1.66
Wahoo	708	614	0.87
Skipjack tuna	34,878	33,608	0.96
Dogtooth tuna	854	1,263	1.48
Yellowfin tuna	15,797	23,765	1.50
Kawakawa	2,236	3,088	1.38
Spiny lobster	452	857	1.90
Octopus	117	176	1.50
** TOTAL **	74,304	92,998	1.25

Table II.1.2

American Samoa January 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	53	87	1.64
Black jack	78	129	1.65
Large barracuda	49	49	1.00
Small barracuda	20	33	1.65
Lunartail grouper	80	132	1.65
Blue lined snapper	189	313	1.66
Humpback snapper	89	147	1.65
Hawaiian opakapaka	82	123	1.50
Gindai (flower snap)	90	165	1.83
Onaga (red snapper)	111	198	1.78
Ehu (red snapper)	35	69	1.97
Longnose emperor	180	298	1.66
Ambon emperor	69	114	1.65
Redgill emperor	206	341	1.66
Rudderfish	29	43	1.48
Lined surgeon	269	406	1.51
Yellow eyed surgeon	241	363	1.51
Unicornfish	125	188	1.50
Squirrelfish	69	104	1.51
Parrotfish	137	206	1.50
Triggerfish	6	9	1.50
Dolphin (mahimahi)	29	33	1.14
Blue marlin	167	168	1.01
Skipjack tuna	12,807	12,166	0.95
Yellowfin tuna	1,197	2,106	1.76
Spiny lobster	100	151	1.51
** SUBTOTAL **	16,507	18,141	1.10

Table II.1.3

American Samoa February 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	14	23	1.64
Black jack	45	74	1.64
Small barracuda	34	56	1.65
Bottom fish	280	464	1.66
Peacock grouper	18	28	1.56
Flagtail grouper	27	44	1.63
Lunartail grouper	20	34	1.70
Blue lined snapper	203	336	1.66
Humpback snapper	27	45	1.67
Ambon emperor	138	241	1.75
Redgill emperor	181	300	1.66
Skipjack tuna	1,155	1,085	0.94
Yellowfin tuna	231	406	1.76
** SUBTOTAL **	2,373	3,136	1.32

Table II.1.4

American Samoa March 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	13	22	1.69
Bottom fish	226	375	1.66
Lunartail grouper	60	102	1.70
Blue lined snapper	138	235	1.70
Rufous snapper	25	42	1.68
Humpback snapper	69	117	1.70
Gray jobfish	50	83	1.66
Yellowtail snapper	6	10	1.67
Longnose emperor	116	198	1.71
Blueline bream	6	10	1.67
Redgill emperor	129	220	1.71
Lined surgeon	119	179	1.50
Spotted surgeonfish	63	95	1.51
Unicornfish	163	246	1.51
Parrotfish	47	70	1.49
Butterflyfish	25	37	1.48
Blue marlin	566	571	1.01
Wahoo	9	9	1.00
Skipjack tuna	613	605	0.99
Yellowfin tuna	543	666	1.23
Kawakawa	1,305	1,970	1.51
** SUBTOTAL **	4,291	5,862	1.37

Table II.1.5

American Samoa April 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad	59	97	1.64
Black jack	114	189	1.66
Barracudas	24	24	1.00
Large barracuda	31	31	1.00
Small barracuda	117	194	1.66
Peacock grouper	23	38	1.65
Flagtail grouper	31	51	1.65
Lunartail grouper	34	56	1.65
Blue lined snapper	81	134	1.65
Gray jobfish	163	270	1.66
Black snapper	16	26	1.63
Longnose emperor	59	97	1.64
Blueline bream	28	46	1.64
Redgill emperor	244	405	1.66
Oilfish	26	43	1.65
Rainbow runner	26	51	1.96
Wahoo	11	11	1.00
Skipjack tuna	704	706	1.00
Yellowfin tuna	543	544	1.00
Kawakawa	566	549	0.97
** SUBTOTAL **	2,900	3,562	1.23

Table II.1.6

American Samoa May 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	74	122	1.65
Small barracuda	87	144	1.66
Peacock grouper	35	58	1.66
Lunartail grouper	38	63	1.66
Blue lined snapper	409	678	1.66
Humpback snapper	119	197	1.66
Gray jobfish	159	263	1.65
Emperors (misc)	88	146	1.66
Longnose emperor	380	630	1.66
Redgill emperor	275	456	1.66
Lined surgeon	148	223	1.51
Yellow eyed surgeon	156	235	1.51
Spotted surgeonfish	72	108	1.50
Unicornfish	585	883	1.51
Squirrelfish	14	23	1.64
Parrotfish	467	705	1.51
Triggerfish	23	38	1.65
Skipjack tuna	906	924	1.02
Dogtooth tuna	9	11	1.25
Yellowfin tuna	1,061	1,061	1.00
Kawakawa	87	144	1.66
Spiny lobster	278	558	2.01
Octopus	117	176	1.50
** SUBTOTAL **	5,587	7,846	1.40

Table II.1.7

American Samoa June 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad	26	43	1.65
Jacks	135	224	1.66
Black jack	46	76	1.65
Barracudas	74	99	1.34
Small barracuda	39	64	1.64
Sharks	56	70	1.25
Groupers	31	51	1.65
Peacock grouper	108	170	1.57
Lunartail grouper	253	419	1.66
Blue lined snapper	546	901	1.65
Humpback snapper	118	195	1.65
Gray jobfish	235	386	1.64
Deepwater bottomfish	20	40	2.00
Gindai (flower snap)	12	18	1.50
Ehu (red snapper)	104	193	1.85
Longnose emperor	304	504	1.66
Ambon emperor	139	230	1.65
Redgill emperor	294	488	1.66
Lined surgeon	27	38	1.41
Parrotfish	141	198	1.40
Dolphin (mahimahi)	33	54	1.64
Blue marlin	300	300	1.00
Wahoo	135	117	0.87
Skipjack tuna	985	988	1.00
Yellowfin tuna	2,458	3,542	1.44
Kawakawa	155	257	1.66
Spiny lobster	74	148	2.00
** SUBTOTAL **	6,848	9,813	1.43

Table II.1.8

American Samoa July 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	58	96	1.66
Black jack	91	151	1.66
Barracudas	57	57	1.00
Groupers	41	68	1.66
Yellowspot grouper	33	65	1.97
Spotted grouper	17	25	1.47
Lunartail grouper	155	308	1.99
Blue lined snapper	418	727	1.74
Humpback snapper	41	81	1.98
Gray jobfish	238	395	1.66
Lehi (silverjaw)	69	114	1.65
Ehu (red snapper)	66	130	1.97
Longnose emperor	191	317	1.66
Ambon emperor	97	193	1.99
Redgill emperor	362	600	1.66
Dolphin (mahimahi)	111	112	1.01
Rainbow runner	65	89	1.37
Wahoo	105	89	0.85
Skipjack tuna	3,357	3,387	1.01
Yellowfin tuna	1,222	2,331	1.91
Kawakawa	44	61	1.39
** SUBTOTAL **	6,838	9,396	1.37

Table II.1.9

American Samoa August 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	30	38	1.25
Black jack	40	67	1.68
Barracudas	74	82	1.11
Small barracuda	146	242	1.66
Tomato grouper	55	81	1.47
Lunartail grouper	88	153	1.74
Blue lined snapper	185	283	1.53
Twinspot/red snapper	25	31	1.25
Humpback snapper	22	39	1.77
Brown jobfish	40	50	1.25
Gray jobfish	265	407	1.54
Opakapaka	30	46	1.53
Gindai (flower snap)	28	42	1.50
Ehu (red snapper)	45	68	1.50
Longnose emperor	91	151	1.66
Ambon emperor	73	127	1.74
Redgill emperor	100	166	1.66
Snake mackerel	64	64	1.00
Squirrelfish	12	24	2.00
Dolphin (mahimahi)	1,218	1,426	1.17
Rainbow runner	24	47	1.96
Wahoo	214	183	0.86
Skipjack tuna	3,531	3,354	0.95
Dogtooth tuna	185	276	1.49
Yellowfin tuna	1,741	2,813	1.62
Kawakawa	56	77	1.37
** SUBTOTAL **	8,382	10,335	1.23

Table II.1.10

American Samoa September 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Amberjack	4	8	2.00
Barracudas	45	45	1.00
Small barracuda	8	10	1.25
Peacock grouper	23	37	1.61
Lunartail grouper	47	81	1.72
Blue lined snapper	136	221	1.63
Gray jobfish	70	116	1.66
Gindai (flower snap)	72	108	1.50
Onaga (red snapper)	23	46	2.00
Ehu (red snapper)	158	237	1.50
Redgill emperor	100	166	1.66
Dolphin (mahimahi)	549	642	1.17
Wahoo	9	9	1.00
Skipjack tuna	1,321	1,313	0.99
Dogtooth tuna	226	335	1.48
Yellowfin tuna	995	1,444	1.45
** SUBTOTAL **	3,786	4,817	1.27

Table II.1.11

American Samoa October 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	74	107	1.45
Black jack	13	26	2.00
Small barracuda	40	62	1.56
Tomato grouper	13	26	2.00
Lunartail grouper	53	101	1.91
Blue lined snapper	167	245	1.47
Humpback snapper	23	39	1.70
Gray jobfish	41	51	1.25
Gindai (flower snap)	82	123	1.50
Onaga (red snapper)	35	70	2.00
Ehu (red snapper)	62	93	1.50
Emperors (misc)	46	76	1.65
Squirrelfish	36	72	2.00
Saber squirrelfish	5	10	2.00
Dolphin (mahimahi)	15	19	1.25
Rainbow runner	15	29	1.93
Wahoo	218	189	0.87
Skipjack tuna	5,605	5,317	0.95
Dogtooth tuna	143	209	1.46
Yellowfin tuna	4,382	7,403	1.69
Kawakawa	23	31	1.33
** SUBTOTAL **	11,091	14,297	1.29

Table II.1.12

American Samoa November 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Black jack	12	24	2.00
Lunartail grouper	5	10	2.00
Blue lined snapper	10	14	1.35
Gindai (flower snap)	12	18	1.50
Ehu (red snapper)	16	24	1.50
Wahoo	7	7	1.00
Skipjack tuna	1,878	1,814	0.97
Dogtooth tuna	13	16	1.25
Yellowfin tuna	952	977	1.03
** SUBTOTAL **	2,905	2,904	1.00

Table II.1.13

American Samoa December 1990 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	30	49	1.63
Skipjack tuna	2,016	1,950	0.97
Dogtooth tuna	278	417	1.50
Yellowfin tuna	472	472	1.00
** SUBTOTAL **	2,796	2,888	1.03
** TOTAL **	74,304	92,998	1.25

Table II.2.1

American Samoa 1990 Annual Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	67	84	1.25
Black jack	29	58	2.00
Amberjack	4	8	2.00
Barracudas	193	193	1.00
Small barracuda	17	21	1.25
Tomato grouper	13	26	2.00
Lunartail grouper	40	80	2.00
Blue lined snapper	235	317	1.35
Twinspot/red snapper	25	31	1.25
Humpback snapper	7	14	2.00
Brown jobfish	40	50	1.25
Gray jobfish	130	163	1.25
Deepwater bottomfish	20	40	2.00
Gindai (flower snap)	206	309	1.50
Onaga (red snapper)	58	116	2.00
Ehu (red snapper)	308	462	1.50
Squirrelfish	48	96	2.00
Saber squirrelfish	5	10	2.00
Dolphin (mahimahi)	30	38	1.25
Blue marlin	300	300	1.00
Rainbow runner	40	40	1.00
Wahoo	89	89	1.00
Skipjack tuna	5,881	5,995	1.02
Dogtooth tuna	93	116	1.25
Yellowfin tuna	5,315	5,315	1.00
Kawakawa	13	16	1.25
** TOTAL **	13,206	13,987	1.06

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No tables are available for the
months of January and February.
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Table II.2.4

American Samoa March 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Wahoo	9	9	1.00
Skipjack tuna	481	481	1.00
Yellowfin tuna	380	380	1.00
** SUBTOTAL **	870	870	1.00

Table II.2.5

American Samoa April 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Barracudas	24	24	1.00
Wahoo	11	11	1.00
Skipjack tuna	424	424	1.00
Yellowfin tuna	406	406	1.00
** SUBTOTAL **	865	865	1.00

Table II.2.6

American Samoa May 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Skipjack tuna	906	924	1.02
Dogtooth tuna	9	11	1.25
Yellowfin tuna	1,061	1,061	1.00
** SUBTOTAL **	1,976	1,996	1.01

Table II.2.7

American Samoa June 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Barracudas	35	35	1.00
Blue lined snapper	15	20	1.35
Gray jobfish	9	11	1.25
Deepwater bottomfish	20	40	2.00
Gindai (flower snap)	12	18	1.50
Ehu (red snapper)	27	41	1.50
Blue marlin	300	300	1.00
Wahoo	19	19	1.00
Skipjack tuna	780	796	1.02
Yellowfin tuna	815	815	1.00
** SUBTOTAL **	2,032	2,095	1.03

Table II.2.8

American Samoa July 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Barracudas	35	35	1.00
Rainbow runner	40	40	1.00
Skipjack tuna	295	295	1.00
Yellowfin tuna	123	123	1.00
** SUBTOTAL **	493	493	1.00

Table II.2.9

American Samoa August 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	30	38	1.25
Black jack	4	8	2.00
Barracudas	54	54	1.00
Blue lined snapper	64	80	1.25
Twinspot/red snapper	25	31	1.25
Humpback snapper	7	14	2.00
Brown jobfish	40	50	1.25
Gray jobfish	80	100	1.25
Gindai (flower snap)	28	42	1.50
Ehu (red snapper)	45	68	1.50
Squirrelfish	12	24	2.00
Dolphin (mahimahi)	6	8	1.25
Wahoo	8	8	1.00
Skipjack tuna	591	591	1.00
Dogtooth tuna	11	14	1.25
Yellowfin tuna	330	330	1.00
Kawakawa	7	9	1.25
** SUBTOTAL **	1,342	1,467	1.09

Table II.2.10

American Samoa September 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Amberjack	4	8	2.00
Barracudas	45	45	1.00
Small barracuda	8	10	1.25
Blue lined snapper	40	60	1.50
Gindai (flower snap)	72	108	1.50
Onaga (red snapper)	23	46	2.00
Ehu (red snapper)	158	237	1.50
Dolphin (mahimahi)	9	11	1.25
Wahoo	9	9	1.00
Skipjack tuna	630	664	1.05
Dogtooth tuna	26	33	1.25
Yellowfin tuna	403	403	1.00
** SUBTOTAL **	1,427	1,633	1.14

Table II.2.11

American Samoa October 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	37	46	1.25
Black jack	13	26	2.00
Small barracuda	9	11	1.25
Tomato grouper	13	26	2.00
Lunartail grouper	35	70	2.00
Blue lined snapper	106	143	1.35
Gray jobfish	41	51	1.25
Gindai (flower snap)	82	123	1.50
Onaga (red snapper)	35	70	2.00
Ehu (red snapper)	62	93	1.50
Squirrelfish	36	72	2.00
Saber squirrelfish	5	10	2.00
Dolphin (mahimahi)	15	19	1.25
Wahoo	26	26	1.00
Skipjack tuna	467	488	1.04
Dogtooth tuna	26	33	1.25
Yellowfin tuna	407	407	1.00
Kawakawa	6	8	1.25
** SUBTOTAL **	1,421	1,721	1.21

Table II.2.12

American Samoa November 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Black jack	12	24	2.00
Lunartail grouper	5	10	2.00
Blue lined snapper	10	14	1.35
Gindai (flower snap)	12	18	1.50
Ehu (red snapper)	16	24	1.50
Wahoo	7	7	1.00
Skipjack tuna	620	632	1.02
Dogtooth tuna	13	16	1.25
Yellowfin tuna	918	918	1.00
** SUBTOTAL **	1,613	1,663	1.03

Table II.2.13

American Samoa December 1990 Manu'a
Estimated Commercial Landings

Species	Pounds	Value	$/lb
Skipjack tuna	687	701	1.02
Dogtooth tuna	8	10	1.25
Yellowfin tuna	472	472	1.00
** SUBTOTAL **	1,167	1,183	1.01
** TOTAL **	13,206	13,987	1.06

Figure II.1.1

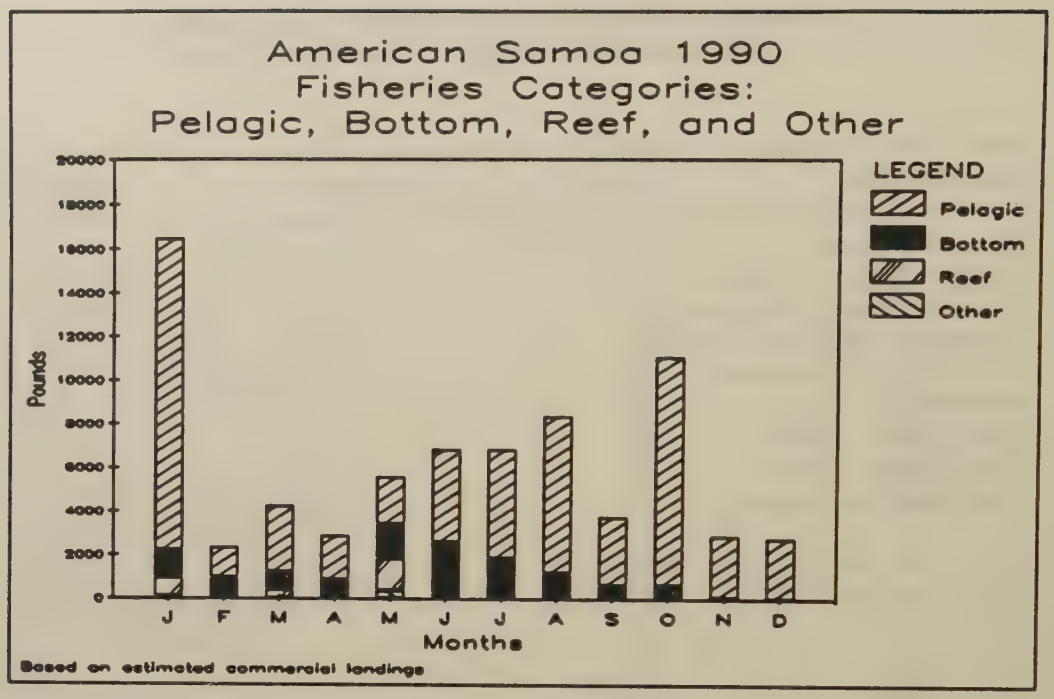


Figure II.1.2

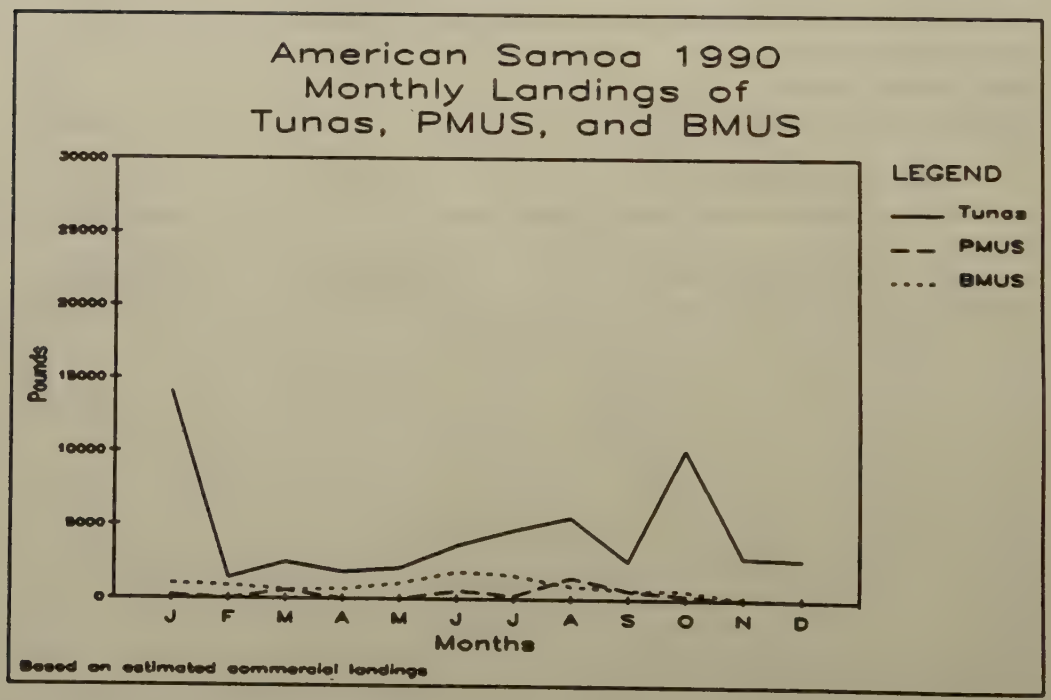


Figure II.1.3

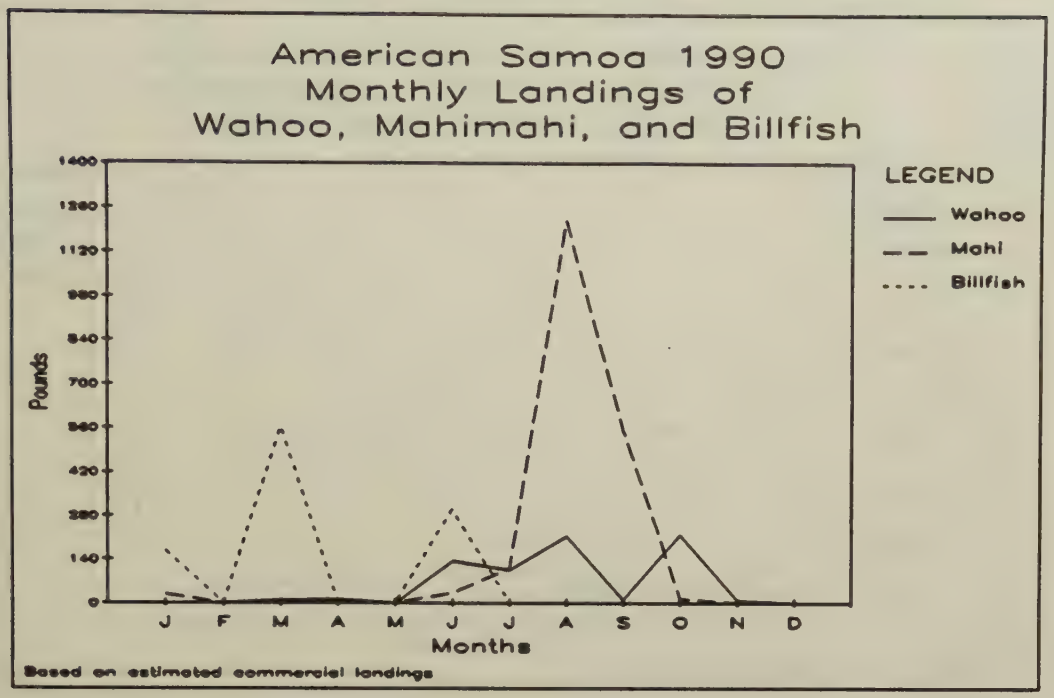


Figure II.1.4

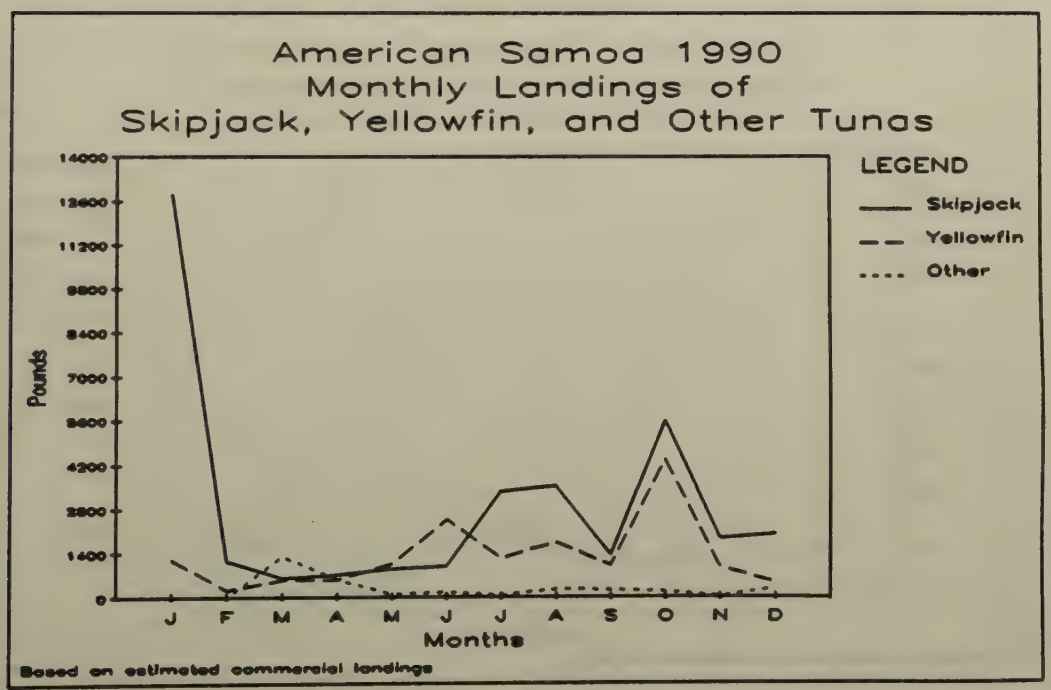


Figure II.2.1

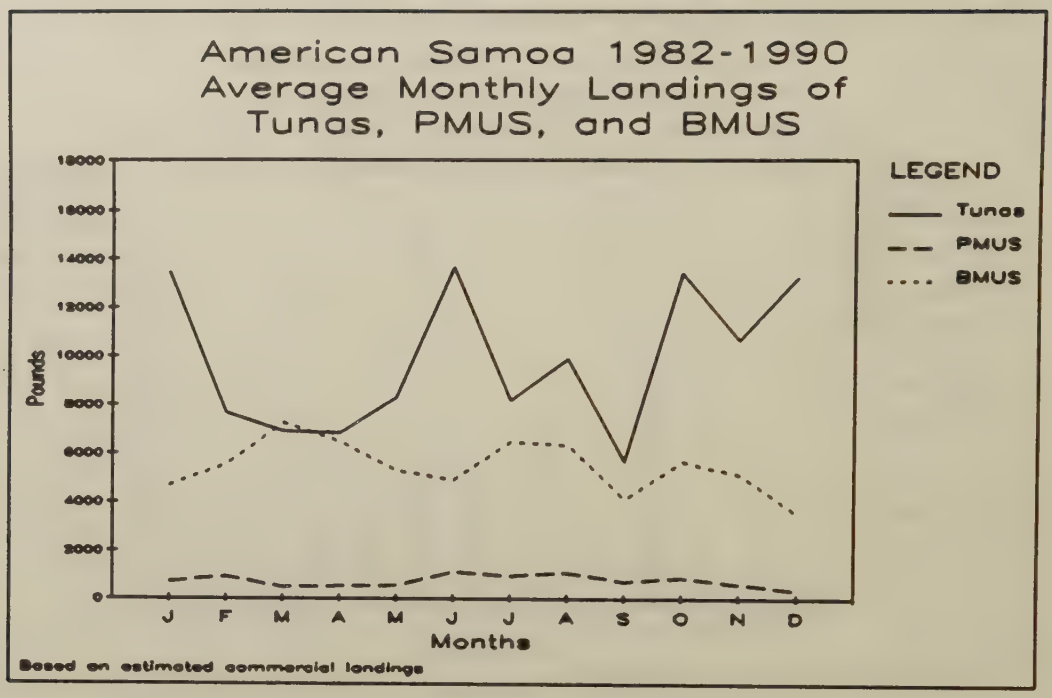
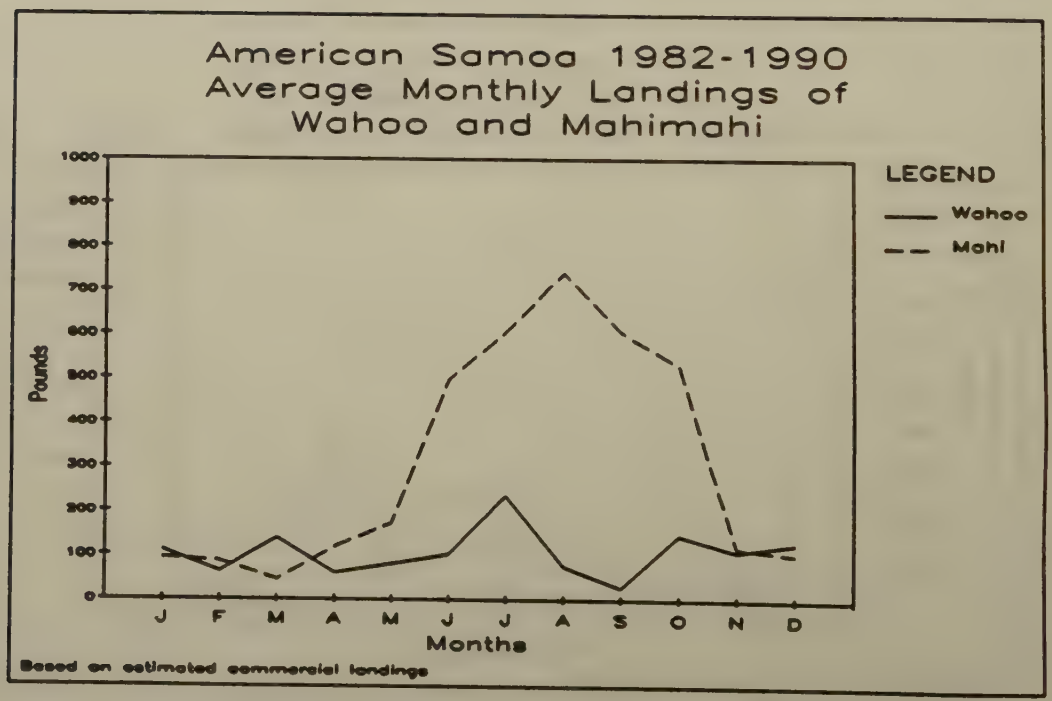


Figure II.2.2



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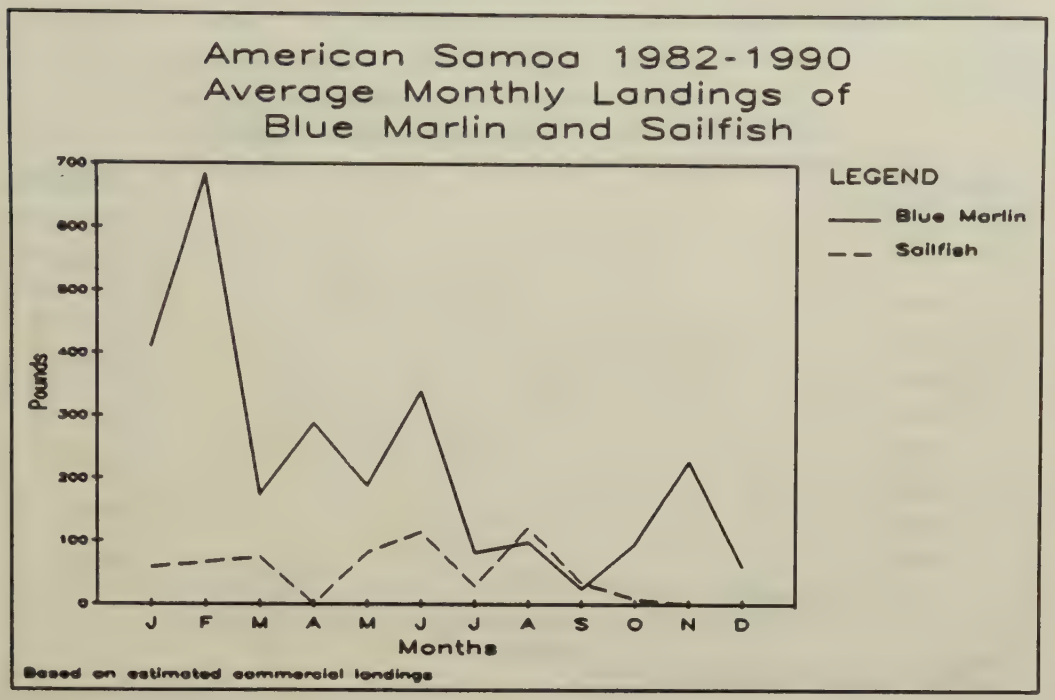

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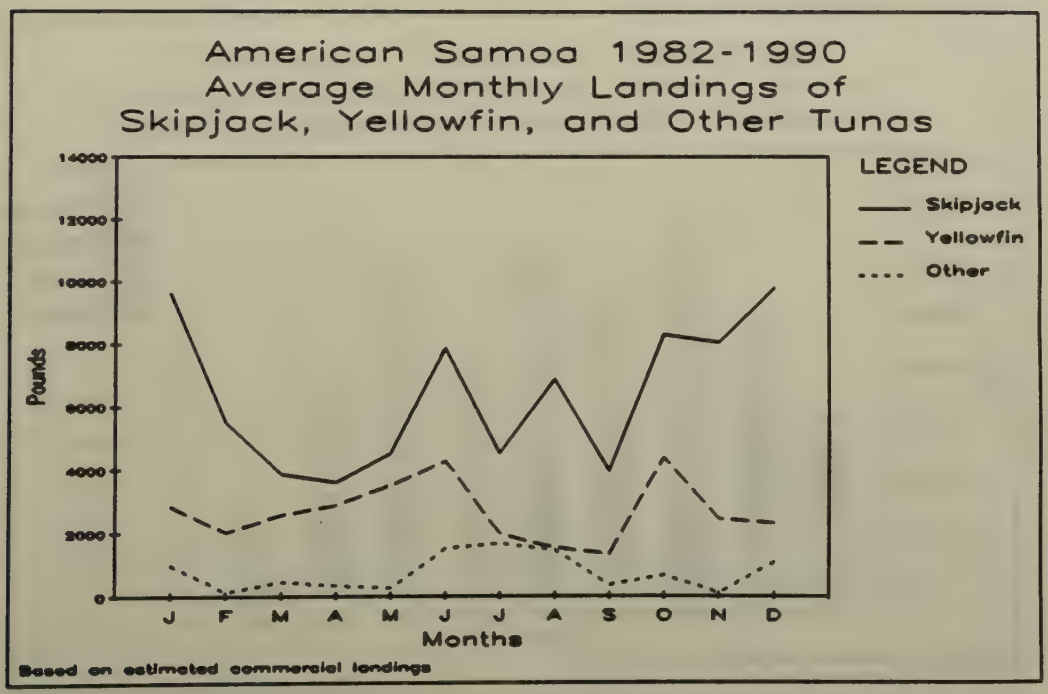

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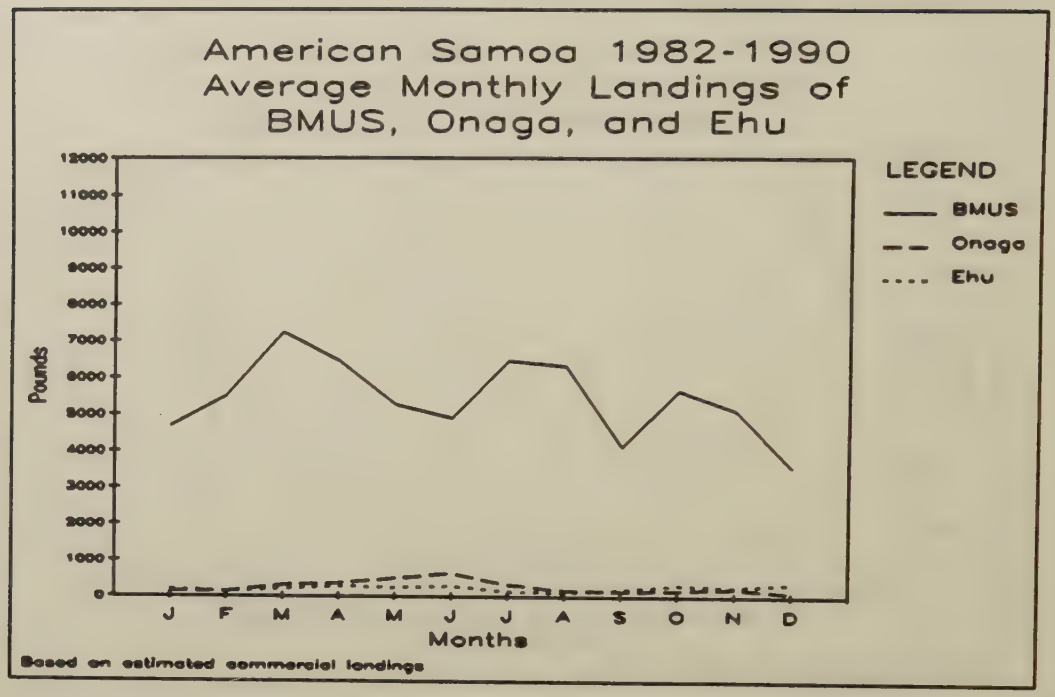

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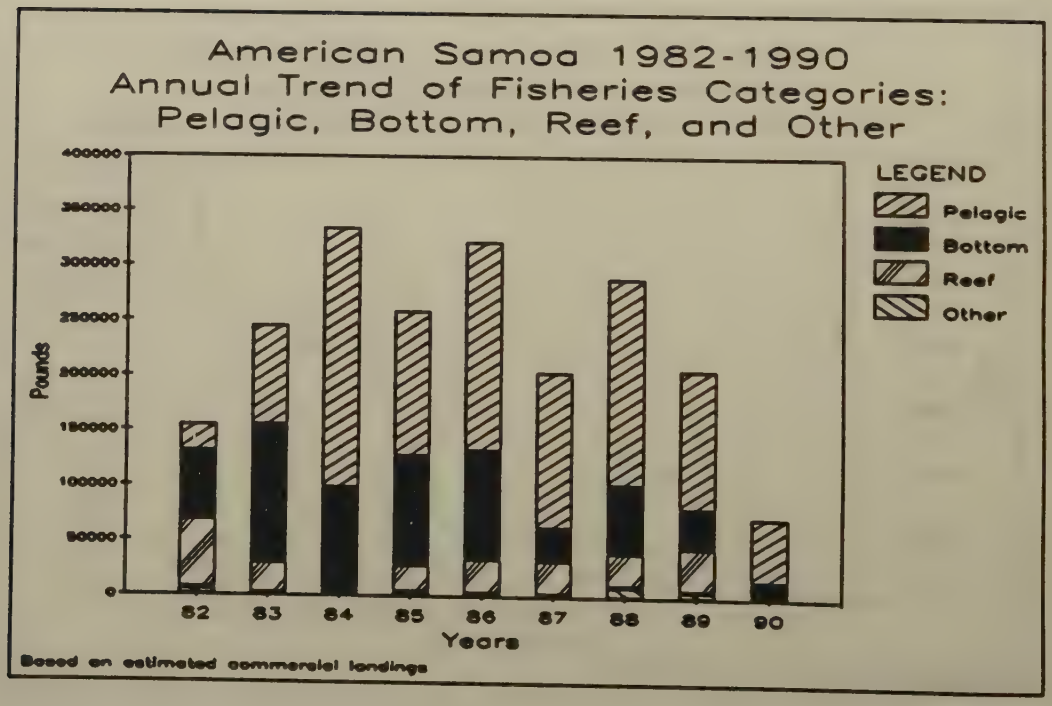

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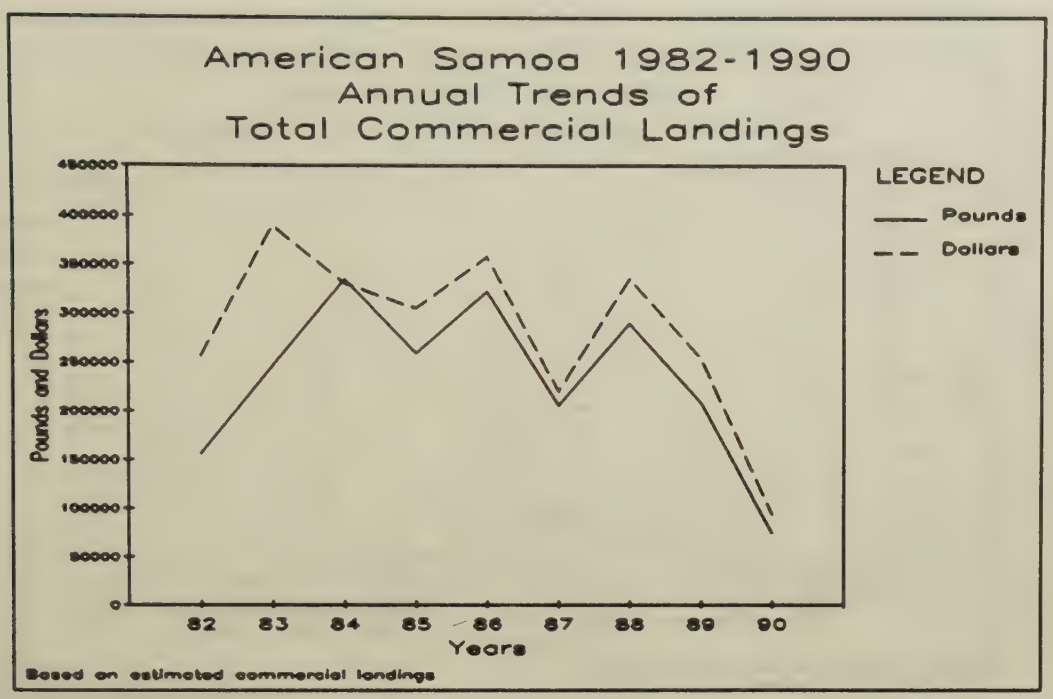

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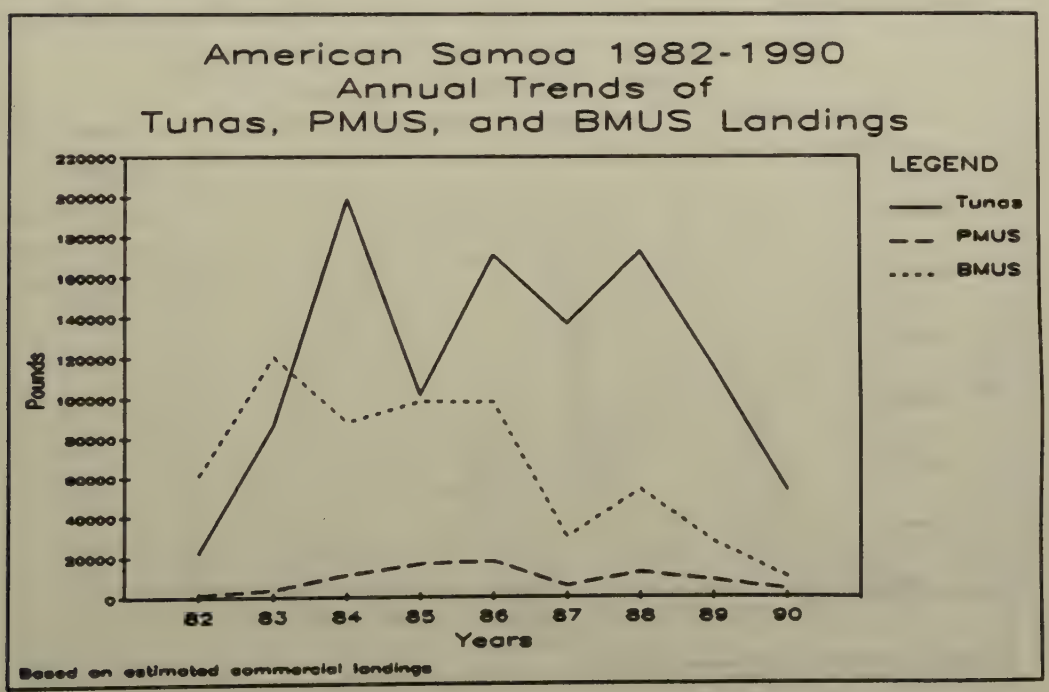

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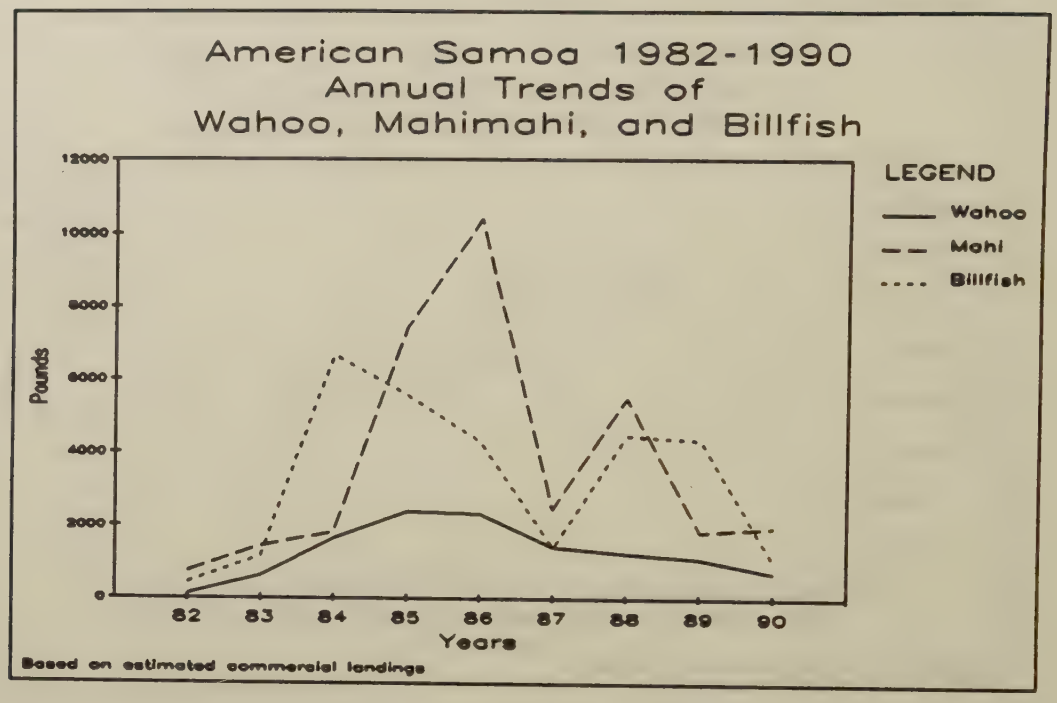

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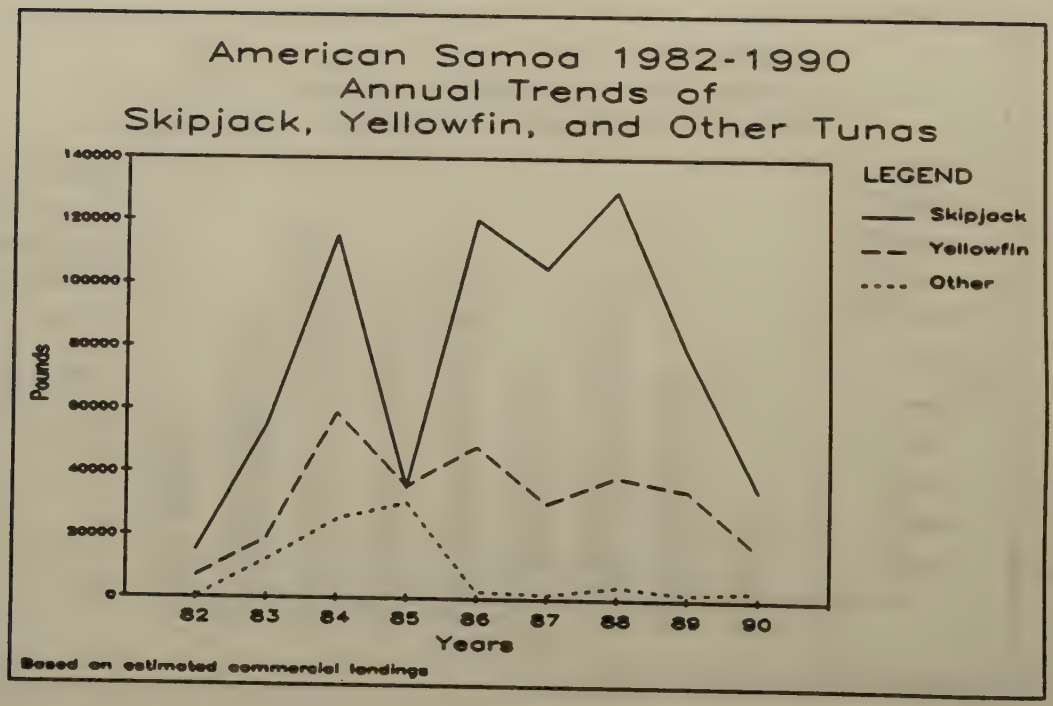

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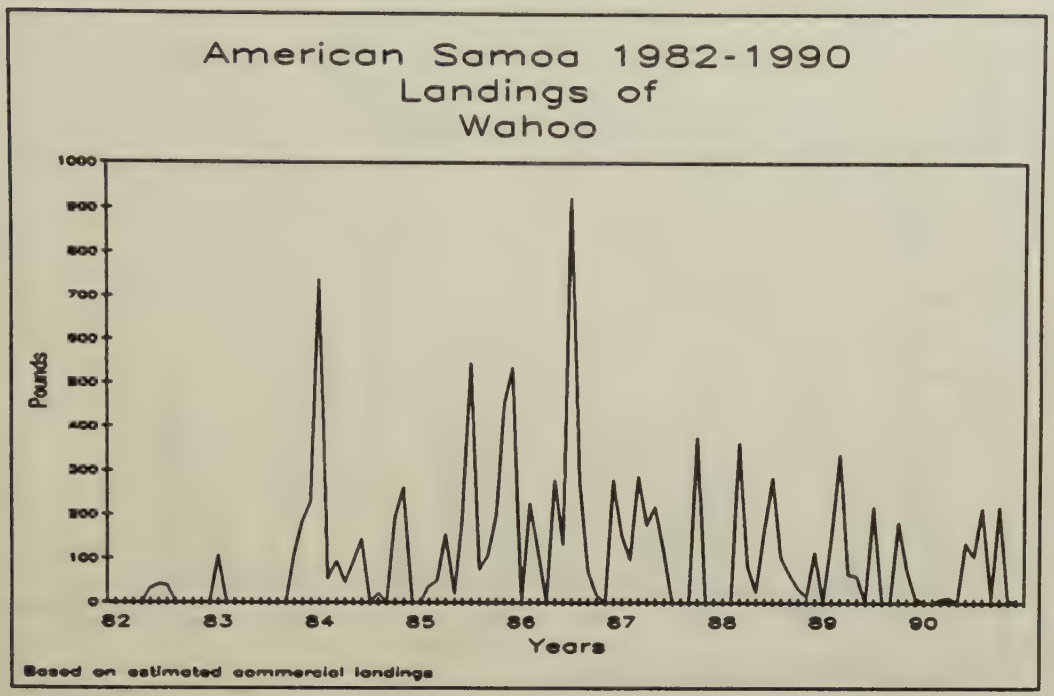

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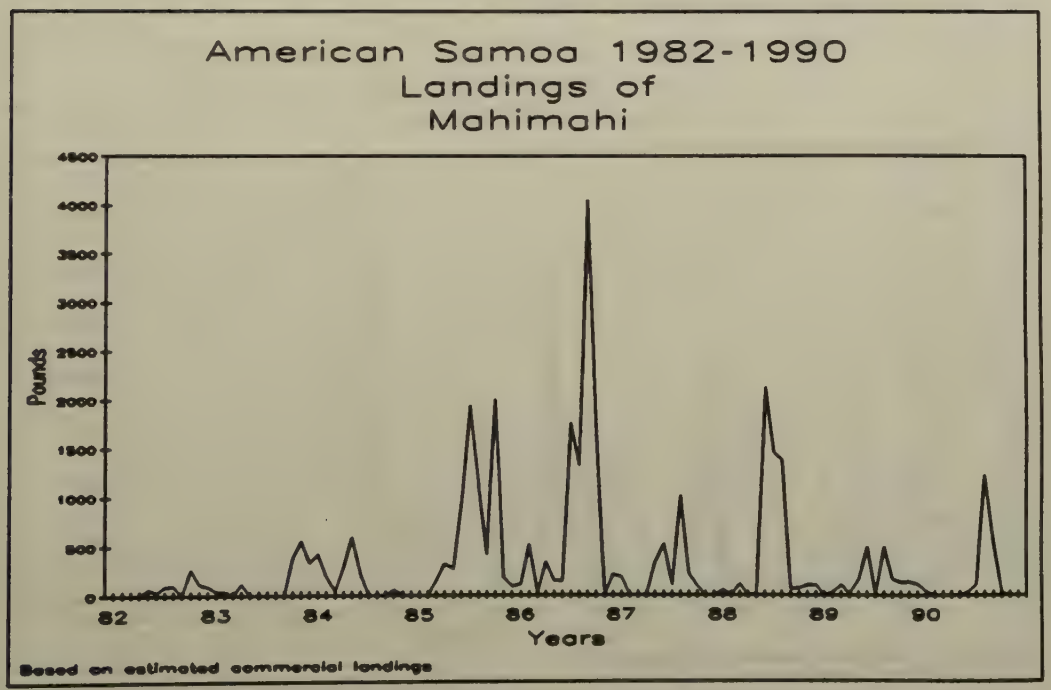

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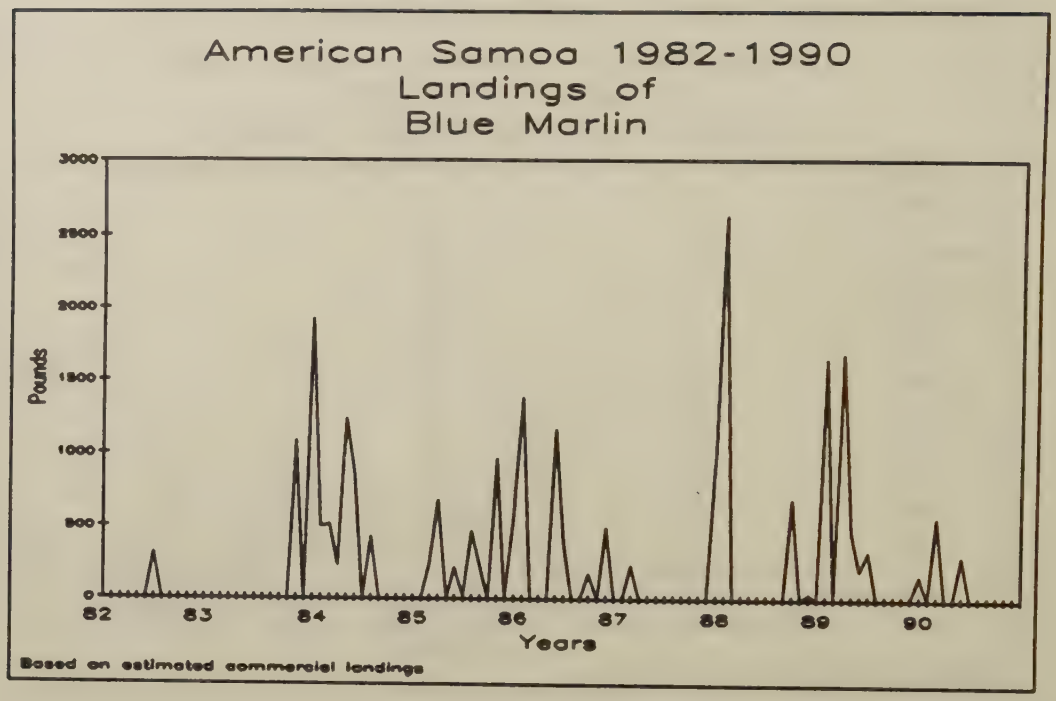

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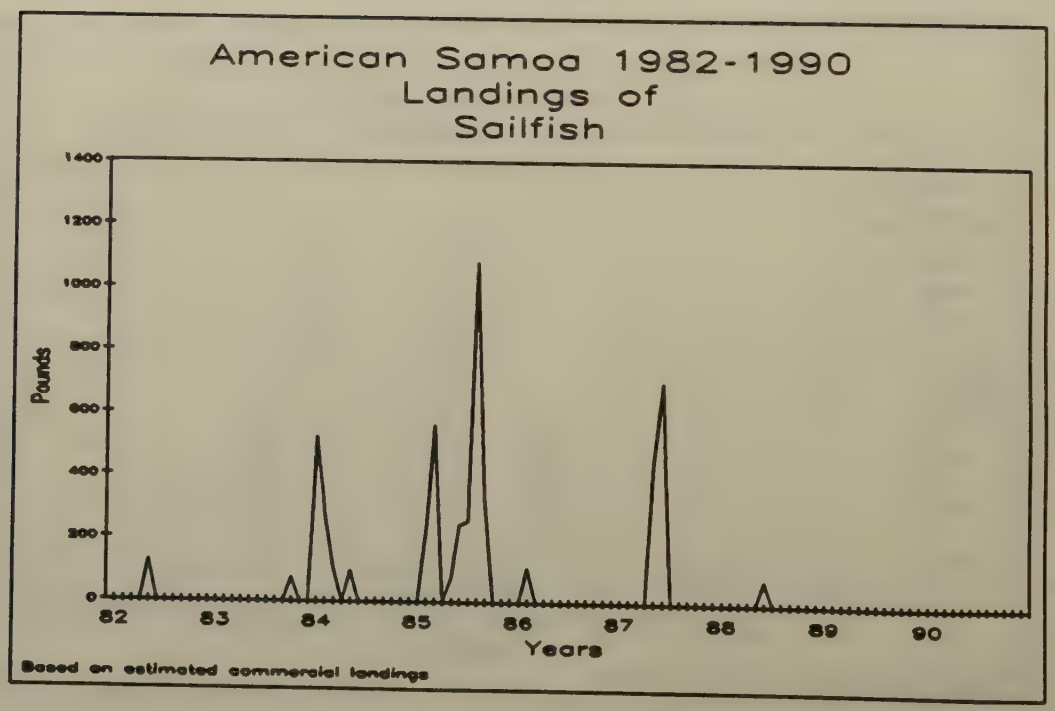

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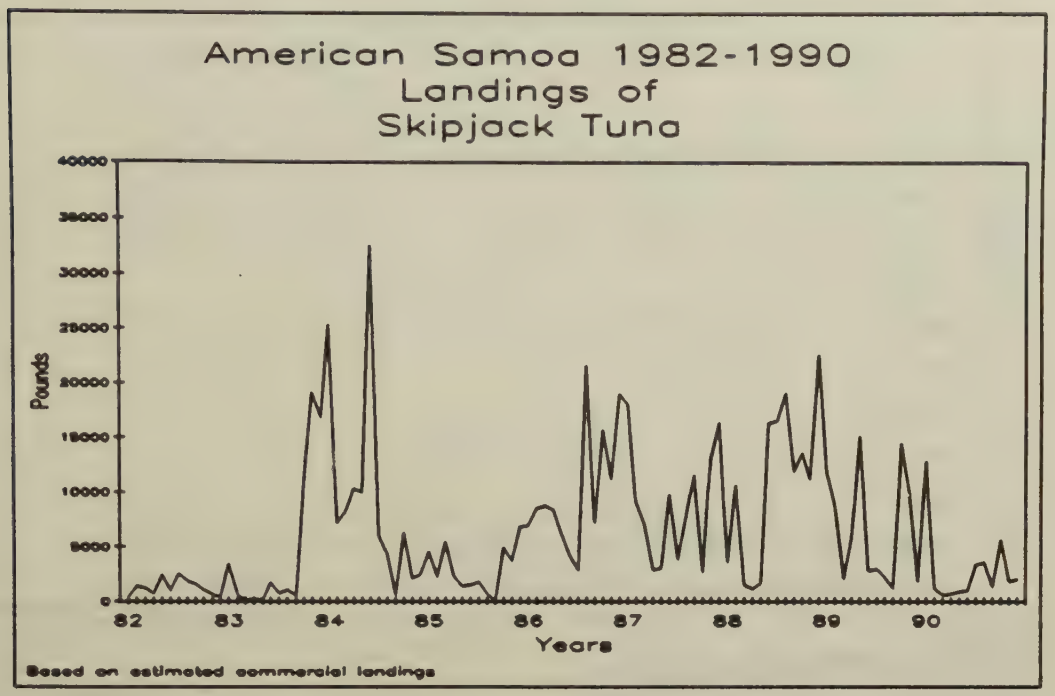

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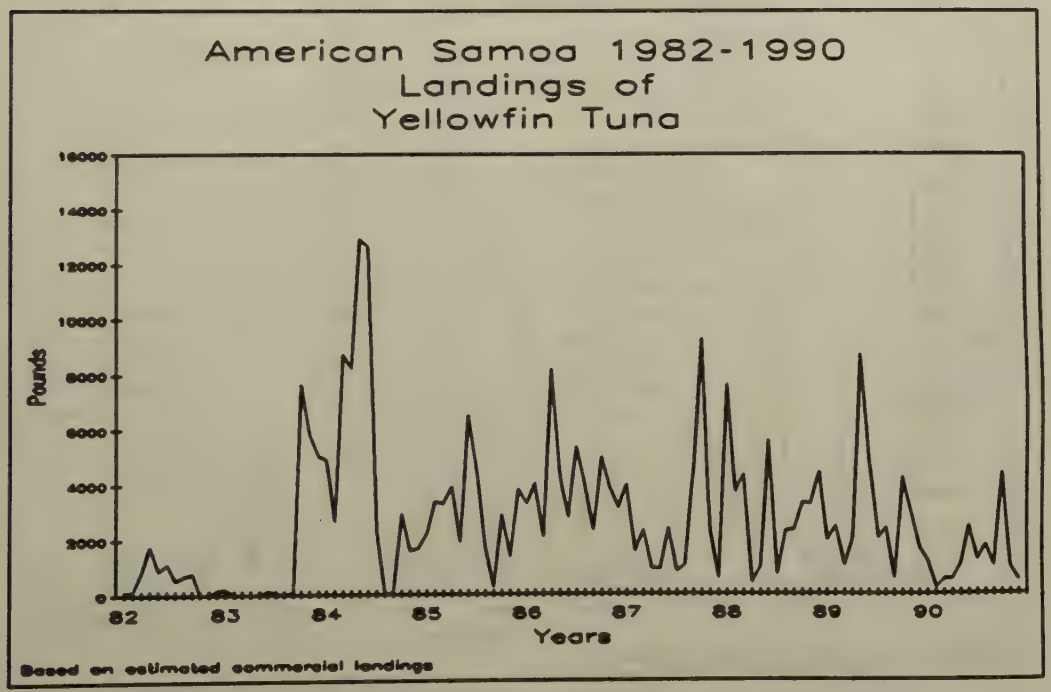

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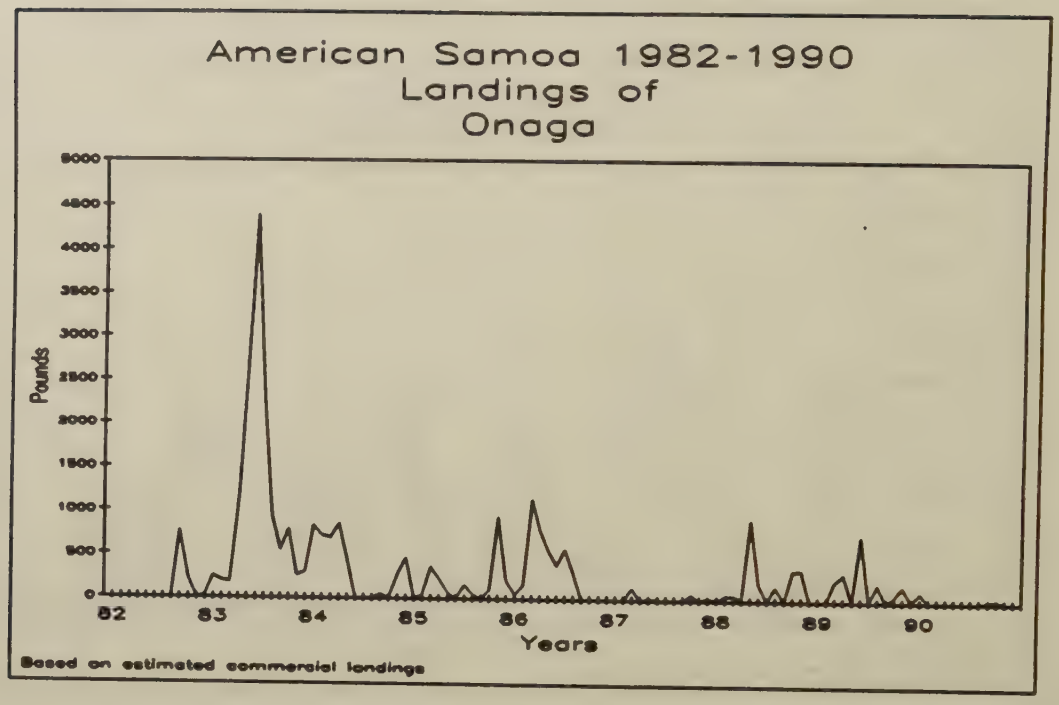

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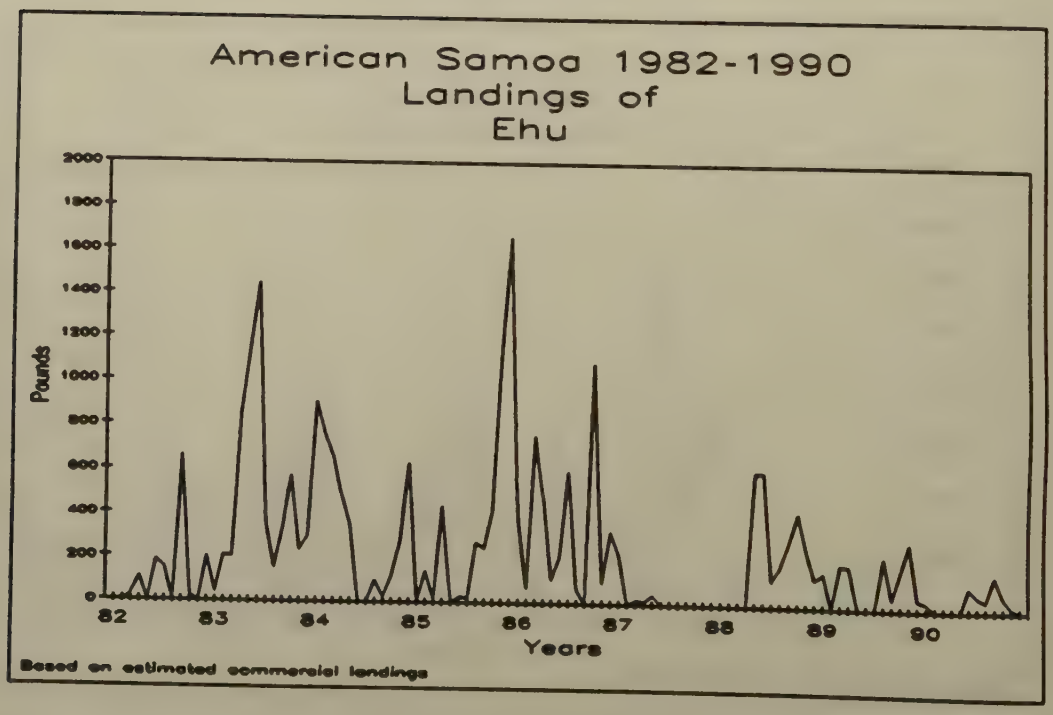


Table II.3.1

Tutuila 1990 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	70420.8	10	3269.1	9	452.0	8	9513.1	9	1320.6	9	24.3	8
Bottom fish	7303.8	19	793.6	19	57.9	17	1738.8	19	127.5	18	10.6	14
Troll-bottom	10741.8	22	880.8	23	44.0	20	2492.7	22	128.7	20	15.0	13
Spearing	4114.2	41	181.5	38	24.2	38	784.2	39	103.2	38	21.0	24
Total:	92580.6	9	5125.0	8	578.1	8	14528.9	9	1680.0	8	20.5	8

Table II.3.2

Tutuila 1990 Annual
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Miscellaneous	12.1	0.01	Bigeye scad	115.1	0.12
Jacks	402.8	0.44	Black jack	538.2	0.58
Barracudas	359.5	0.39	Large barracuda	104.4	0.11
Small barracuda	752.4	0.81	Sharks	1797.4	1.94
Bottom fish	591.2	0.64	Groupers	79.9	0.09
Peacock grouper	225.4	0.24	Flagtail grouper	63.6	0.07
Tomato grouper	54.3	0.06	Yellowspot grouper	34.6	0.04
Spotted grouper	17.3	0.02	Lunartail grouper	902.0	0.97
Blue lined snapper	2615.4	2.82	Rufous snapper	24.1	0.03
Twinspot/red snapper	499.1	0.54	Humpback snapper	570.3	0.62
Gray jobfish	1196.5	1.29	Hawaiian opakapaka	121.2	0.13
Opakapaka	30.2	0.03	Gindai (flower snap)	132.7	0.14
Yellowtail snapper	6.0	0.01	Lehi (silverjaw)	150.8	0.16
Onaga (red snapper)	253.5	0.27	Ehu (red snapper)	207.7	0.22
Black snapper	14.4	0.02	Goldenline bream	15.1	0.02
Emperors (misc)	225.2	0.24	Longnose emperor	1457.0	1.57
Ambon emperor	682.2	0.74	Blueline bream	30.6	0.03
Redgill emperor	2096.0	2.26	Snake mackerel	63.3	0.07
Oilfish	23.1	0.02	Rudderfish	45.4	0.05
Lined surgeon	715.6	0.77	Yellow eyed surgeon	535.5	0.58
Spotted surgeonfish	136.2	0.15	Unicornfish	962.2	1.04
Squirrelfish	121.0	0.13	Parrotfish	910.7	0.98
Triggerfish	47.9	0.05	Butterflyfish	24.2	0.03
Dolphin (mahimahi)	2891.6	3.12	Blue marlin	2784.4	3.01
Rainbow runner	197.1	0.21	Wahoo	1172.5	1.27
Skipjack tuna	41948.6	45.31	Dogtooth tuna	1005.0	1.09
Yellowfin tuna	19176.9	20.71	Kawakawa	2786.9	3.01
Spiny lobster	531.8	0.57	Octopus	122.5	0.13
Total all species:	92580.6	100.00			

Table II.4.1

Tutuila January 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	14414.8	28	401.1	24	59.6	24	1005.4	26	151.9	26	38.0	18
Bottomfish	309.2	77	23.3	77	2.9	77	46.7	77	5.8	77	13.3	0*
Troll-bottom	2072.3	43	218.8	50	8.8	39	437.5	50	17.5	39	11.2	44*
Spearing	1443.8	53	67.1	52	8.8	55	326.7	51	40.8	52	21.3	14*
Total:	18240.0	21	710.3	21	80.0	17	1816.3	20	216.0	18	30.8	21

Table II.4.2

Tutuila February 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	1601.8	55	29.0	50	5.3	49	58.1	50	10.6	49	10.7	47
Bottom fish	1169.0	41	87.1	37	7.9	37	174.2	37	15.8	37	9.9	79*
Total:	2770.8	47	116.1	38	13.2	39	232.2	38	26.4	39	5.1	32

Table II.4.3

Tutuila March 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	2395.3	32	157.2	32	21.9	27	456.2	37	62.2	32	6.1	25
Bottom fish	976.4	40	270.6	40	11.0	40	541.2	40	21.9	40	1.5	130*
Spearing	486.4	82	21.9	82	3.7	82	109.7	82	18.3	82	7.4	177*
Total:	3858.0	30	449.8	31	36.6	27	1107.1	31	102.4	28	3.4	21

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.4

Tutuila April 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	2857.9	33	266.1	31	43.1	31	805.4	30	130.2	31	2.8	4
Bottom fish	754.8	78	31.6	78	3.2	78	63.2	78	6.3	78	3.0	291*
Troll-bottom	153.2	78	75.8	78	3.2	78	227.4	78	9.5	78	.5	205*
Total:	3765.9	36	373.5	33	49.4	32	1095.9	32	145.9	30	2.2	54

Table II.4.5

Tutuila May 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	5619.1	38	155.8	37	20.4	35	509.3	39	67.4	37	5.7	
Bottom fish	1526.7	46	160.1	46	11.7	47	379.0	45	29.3	47	2.7	152*
Troll-bottom	604.7	79	39.4	79	2.8	79	118.1	79	8.4	79	3.1	0*
Spearing	1923.5	79	71.8	79	9.2	79	311.2	79	39.7	79	6.7	205*
Total:	9673.9	28	427.1	29	44.1	28	1317.6	29	144.9	30	5.1	22

Table II.4.6

Tutuila June 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	4681.1	29	330.5	30	47.5	32	1081.1	28	154.2	30	4.5	0
Bottom fish	31.1	71	11.1	71	2.2	71	11.1	71	2.2	71	.2	168
Troll-bottom	4123.9	36	190.3	41	13.1	39	553.7	38	38.6	36	11.0	34
Spearing	294.5	77	21.6	77	2.9	77	43.2	77	5.8	77	2.7	22*
Total:	9130.6	26	553.5	25	65.7	29	1689.1	25	200.8	27	3.2	0

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.7

Tutuila July 1990
Offshore Creel Survey Expansion Summary

Gear	catch	cv	boat hrs	cv	boat cnt	cv	prsn hrs	cv	prsn cnt	cv	cpue	cv
Trolling	11099.2	21	523.7	23	66.3	23	1722.8	23	215.5	22	6.3	0
Bottom fish	994.4	55	87.2	56	5.5	54	207.3	54	13.8	55	1.8	102
Troll-bottom	1115.3	56	116.2	55	5.5	54	398.0	54	19.3	55	1.8	8
Total:	13208.9	21	727.0	25	77.4	24	2328.1	25	248.6	24	5.2	0

Table II.4.8

Tutuila August 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	7467.5	26	377.8	25	52.2	26	1058.6	30	147.8	32	3.3	0
Bottom fish	986.5	58	56.9	56	5.7	56	145.8	58	14.6	58	2.1	52
Total:	8454.0	22	434.8	21	57.9	23	1204.4	26	162.4	29	3.0	0

Table II.4.9

Tutuila September 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	2305.6	31	187.7	30	26.1	31	520.4	37	71.6	36	1.5	0
Bottom fish	217.5	78	44.5	78	3.0	78	133.6	78	8.9	78	.3	48
Troll-bottom	1825.0	57	171.4	66	5.7	55	514.1	66	17.2	55	2.4	59
Total:	4348.0	37	403.6	39	34.8	31	1168.1	42	97.7	35	1.4	0

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.10

Tutuila October 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	11524.8	32	410.2	20	45.6	21	1014.9	22	112.1	23	3.6	0
Bottom fish	287.4	79	38.5	79	4.5	79	77.0	79	9.1	79	.4	56
Total:	11812.3	32	448.7	21	50.1	23	1091.9	23	121.2	25	3.0	0

Table II.4.11

Tutuila November 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	3376.7	34	193.8	31	26.4	31	573.8	32	79.9	31	1.4	0
Total:	3376.7	34	193.8	31	26.4	31	573.8	32	79.9	31	1.2	0

Table II.4.12

Tutuila December 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	cpue	cv
Trolling	3446.4	36	249.9	41	40.4	36	744.3	37	125.8	35	1.0	0
Troll-bottom	352.4	79	41.7	79	3.5	79	166.7	79	13.9	79	.6	76
Total:	3798.8	31	291.6	34	43.9	32	910.9	31	139.7	31	1.0	0

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.5.1

Tutuila January 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	78.8	0.43	Black jack	116.7	0.64
Large barracuda	74.8	0.41	Small barracuda	29.2	0.16
Sharks	314.0	1.72	Lunartail grouper	119.6	0.66
Blue lined snapper	281.5	1.54	Humpback snapper	132.7	0.73
Hawaiian opakapaka	122.5	0.67	Gindai (flower snap)	134.2	0.74
Onaga (red snapper)	164.8	0.90	Ehu (red snapper)	52.5	0.29
Longnose emperor	268.3	1.47	Ambon emperor	102.1	0.56
Redgill emperor	306.3	1.68	Rudderfish	43.8	0.24
Lined surgeon	399.6	2.19	Yellow eyed surgeon	358.8	1.97
Unicornfish	186.7	1.02	Squirrelfish	102.1	0.56
Parrotfish	204.2	1.12	Triggerfish	8.8	0.05
Dolphin (mahimahi)	209.3	1.15	Blue marlin	254.2	1.39
Wahoo	59.8	0.33	Skipjack tuna	11675.4	64.01
Yellowfin tuna	2291.1	12.56	Spiny lobster	148.8	0.82
Total all species:	18240.0	100.00			

Table II.5.2

Tutuila February 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	15.8	0.57	Black jack	52.8	1.90
Small barracuda	39.6	1.43	Bottom fish	327.2	11.81
Peacock grouper	21.1	0.76	Flagtail grouper	31.7	1.14
Lunartail grouper	23.8	0.86	Blue lined snapper	237.5	8.57
Humpback snapper	31.7	1.14	Ambon emperor	161.0	5.81
Redgill emperor	211.1	7.62	Skipjack tuna	1348.5	48.67
Yellowfin tuna	269.2	9.71			
Total all species:	2770.8	100.00			

Table II.5.3

Tutuila March 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Bigeye scad	38.4	1.00	Small barracuda	14.6	0.38
Bottom fish	263.3	6.82	Lunartail grouper	69.5	1.80
Blue lined snapper	160.9	4.17	Rufous snapper	29.3	0.76
Humpback snapper	80.5	2.09	Gray jobfish	58.5	1.52
Yellowtail snapper	7.3	0.19	Longnose emperor	135.3	3.51
Blueline bream	7.3	0.19	Redgill emperor	149.9	3.89
Lined surgeon	139.0	3.60	Spotted surgeonfish	73.1	1.90
Unicornfish	190.2	4.93	Parrotfish	54.9	1.42
Butterflyfish	29.3	0.76	Blue marlin	1060.5	27.49
Skipjack tuna	153.6	3.98	Yellowfin tuna	190.2	4.93
Kawakawa	952.6	24.69			
Total all species:	3858.0	100.00			

Table II.5.4

Tutuila April 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Bigeye scad	60.0	1.59	Black jack	110.5	2.94
Large barracuda	31.6	0.84	Small barracuda	113.7	3.02
Sharks	666.2	17.69	Peacock grouper	22.1	0.59
Flagtail grouper	30.0	0.80	Lunartail grouper	33.2	0.88
Blue lined snapper	79.0	2.10	Gray jobfish	157.9	4.19
Black snapper	15.8	0.42	Longnose emperor	56.8	1.51
Blueline bream	26.8	0.71	Redgill emperor	236.9	6.29
Oilfish	25.3	0.67	Rainbow runner	61.6	1.64
Skipjack tuna	879.3	23.35	Yellowfin tuna	329.8	8.76
Kawakawa	829.4	22.02			
Total all species:	3765.9	100.00			

Table II.5.5

Tutuila May 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	75.3	0.78	Small barracuda	86.1	0.89
Sharks	186.0	1.92	Peacock grouper	33.8	0.35
Lunartail grouper	66.5	0.69	Blue lined snapper	411.5	4.25
Twinspot/red snapper	5.9	0.06	Humpback snapper	119.0	1.23
Gray jobfish	158.2	1.64	Lehi (silverjaw)	73.8	0.76
Onaga (red snapper)	88.6	0.92	Emperors (misc)	90.1	0.93
Longnose emperor	383.3	3.96	Redgill emperor	274.9	2.84
Lined surgeon	155.8	1.61	Yellow eyed surgeon	165.0	1.71
Spotted surgeonfish	76.4	0.79	Unicornfish	617.2	6.38
Squirrelfish	14.8	0.15	Parrotfish	491.9	5.09
Triggerfish	23.6	0.24	Dolphin (mahimahi)	364.8	3.77
Blue marlin	443.5	4.58	Rainbow runner	44.3	0.46
Wahoo	198.9	2.06	Skipjack tuna	2825.6	29.21
Dogtooth tuna	44.3	0.46	Yellowfin tuna	1600.2	16.54
Kawakawa	137.5	1.42	Spiny lobster	293.3	3.03
Octopus	123.8	1.28			
Total all species:	9673.9	100.00			

Table II.5.6

Tutuila June 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Miscellaneous	8.9	0.10	Bigeye scad	25.6	0.28
Jacks	146.6	1.61	Black jack	46.1	0.50
Barracudas	258.5	2.83	Small barracuda	38.4	0.42
Sharks	288.6	3.16	Groupers	30.7	0.34
Peacock grouper	110.1	1.21	Lunartail grouper	252.1	2.76
Blue lined snapper	529.9	5.80	Humpback snapper	117.8	1.29
Gray jobfish	225.3	2.47	Ehu (red snapper)	76.8	0.84
Goldenline bream	11.1	0.12	Longnose emperor	303.3	3.32
Ambon emperor	138.2	1.51	Redgill emperor	293.1	3.21
Lined surgeon	30.2	0.33	Parrotfish	158.4	1.74
Triggerfish	11.1	0.12	Dolphin (mahimahi)	33.3	0.36
Blue marlin	733.5	8.03	Wahoo	115.2	1.26
Skipjack tuna	1398.0	15.31	Yellowfin tuna	3008.1	32.95
Kawakawa	658.9	7.22	Spiny lobster	82.8	0.91
Total all species:	9130.6	100.00			

Table II.5.7

Tutuila July 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	58.0	0.44	Black jack	91.1	0.69
Barracudas	22.1	0.17	Small barracuda	124.5	0.94
Sharks	124.5	0.94	Groupers	41.4	0.31
Yellowspot grouper	33.1	0.25	Spotted grouper	16.6	0.13
Lunartail grouper	154.6	1.17	Blue lined snapper	417.0	3.16
Twinspot/red snapper	55.2	0.42	Humpback snapper	41.4	0.31
Gray jobfish	237.5	1.80	Lehi (silverjaw)	69.1	0.52
Ehu (red snapper)	66.3	0.50	Longnose emperor	190.5	1.44
Ambon emperor	96.6	0.73	Redgill emperor	361.8	2.74
Dolphin (mahimahi)	304.2	2.30	Blue marlin	249.0	1.89
Rainbow runner	24.8	0.19	Wahoo	221.3	1.68
Skipjack tuna	6102.3	46.20	Dogtooth tuna	33.2	0.25
Yellowfin tuna	3881.9	29.39	Kawakawa	190.8	1.44
Total all species:	13208.9	100.00			

Table II.5.8

Tutuila August 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	35.0	0.41	Barracudas	19.9	0.23
Small barracuda	141.3	1.67	Tomato grouper	52.5	0.62
Lunartail grouper	84.5	1.00	Blue lined snapper	116.6	1.38
Humpback snapper	14.6	0.17	Gray jobfish	177.8	2.10
Opakapaka	29.1	0.34	Longnose emperor	87.4	1.03
Ambon emperor	69.9	0.83	Redgill emperor	96.2	1.14
Snake mackerel	61.2	0.72	Dolphin (mahimahi)	1341.1	15.86
Rainbow runner	24.4	0.29	Wahoo	207.7	2.46
Skipjack tuna	4252.3	50.30	Dogtooth tuna	173.2	2.05
Yellowfin tuna	1420.5	16.80	Kawakawa	48.9	0.58
Total all species:	8454.0	100.00			

Table II.5.9

Tutuila September 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	69.2	1.59	Small barracuda	87.1	2.02
Sharks	190.3	4.38	Peacock grouper	23.8	0.55
Lunartail grouper	47.1	1.08	Blue lined snapper	166.1	3.82
Twinspot/red snapper	432.5	9.95	Gray jobfish	71.3	1.64
Ambon emperor	63.4	1.46	Redgill emperor	99.5	2.29
Dolphin (mahimahi)	538.6	12.39	Rainbow runner	23.1	0.53
Wahoo	52.6	1.21	Skipjack tuna	1067.4	24.55
Dogtooth tuna	252.1	5.80	Yellowfin tuna	1163.5	26.76
Total all species:	4348.0	100.00			

Table II.5.10

Tutuila October 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Small barracuda	45.3	0.38	Lunartail grouper	27.2	0.23
Blue lined snapper	90.5	0.77	Humpback snapper	34.0	0.29
Gray jobfish	82.6	0.70	Emperors (misc)	67.9	0.57
Rainbow runner	31.4	0.27	Wahoo	312.9	2.65
Skipjack tuna	6213.3	52.60	Dogtooth tuna	314.6	2.66
Yellowfin tuna	4540.0	38.43	Kawakawa	52.7	0.45
Total all species:	11812.3	100.00			

Table II.5.11

Tutuila November 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Skipjack tuna	3343.0	99.00	Yellowfin tuna	33.8	1.00
Total all species:	3376.7	100.00			

Table II.5.12

Tutuila December 1990
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Small barracuda	29.8	0.78	Blue lined snapper	52.1	1.37
Emperors (misc)	105.9	2.79	Dolphin (mahimahi)	52.1	1.37
Skipjack tuna	3231.6	85.07	Dogtooth tuna	269.8	7.10
Yellowfin tuna	57.6	1.52			
Total all species:	3798.8	100.00			

Figure II.5.1

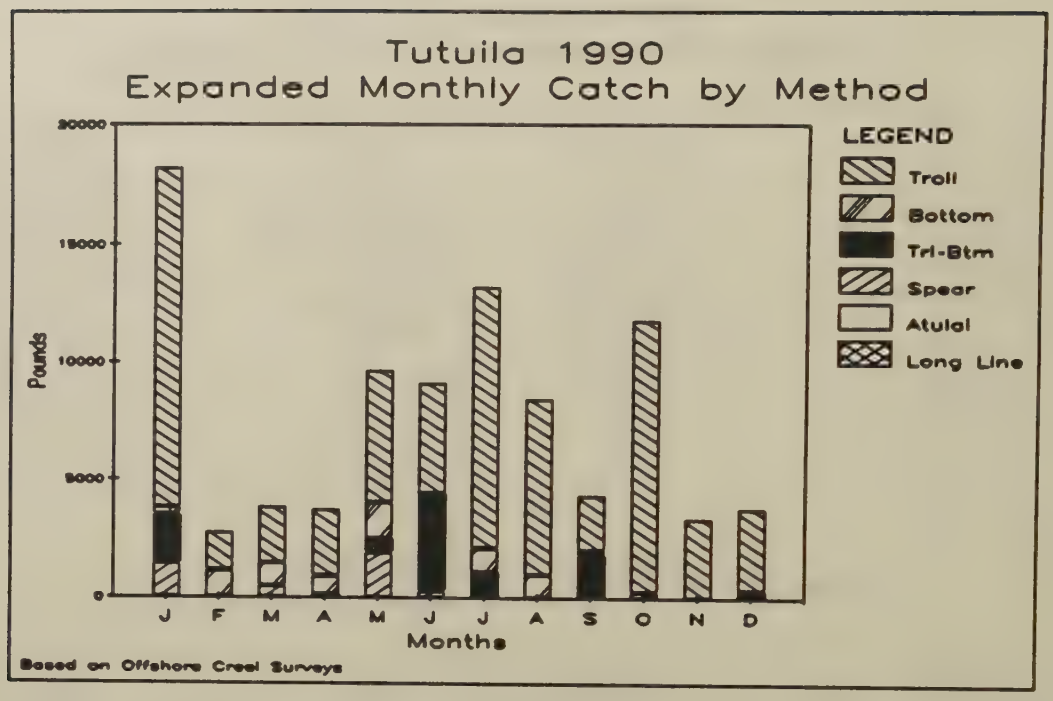


Figure II.5.2

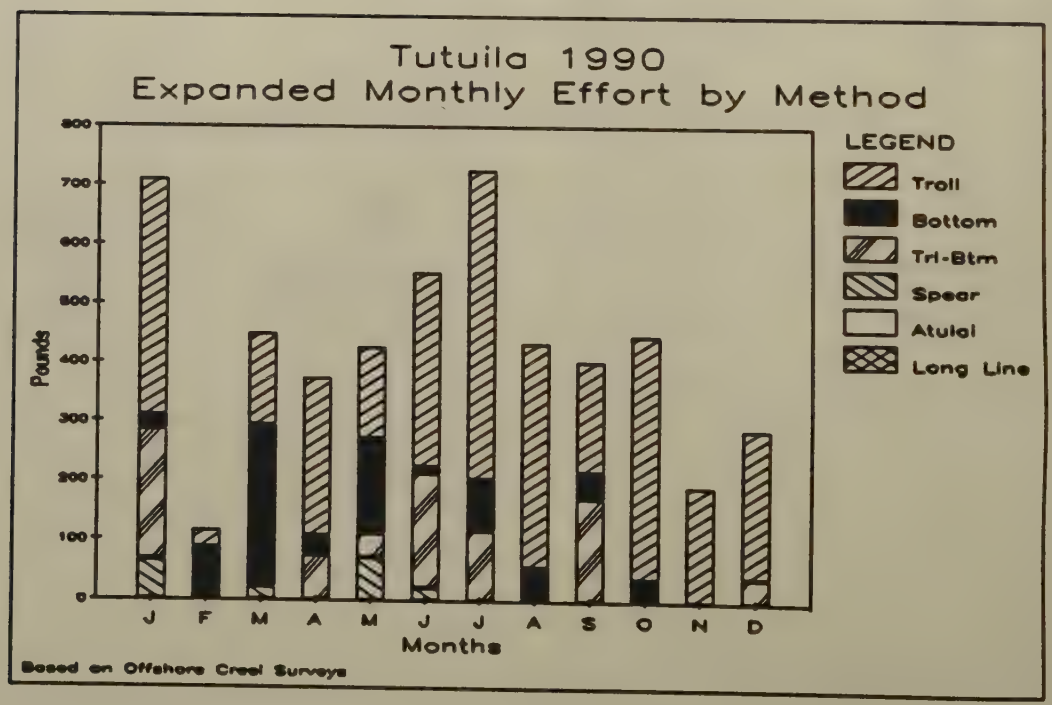
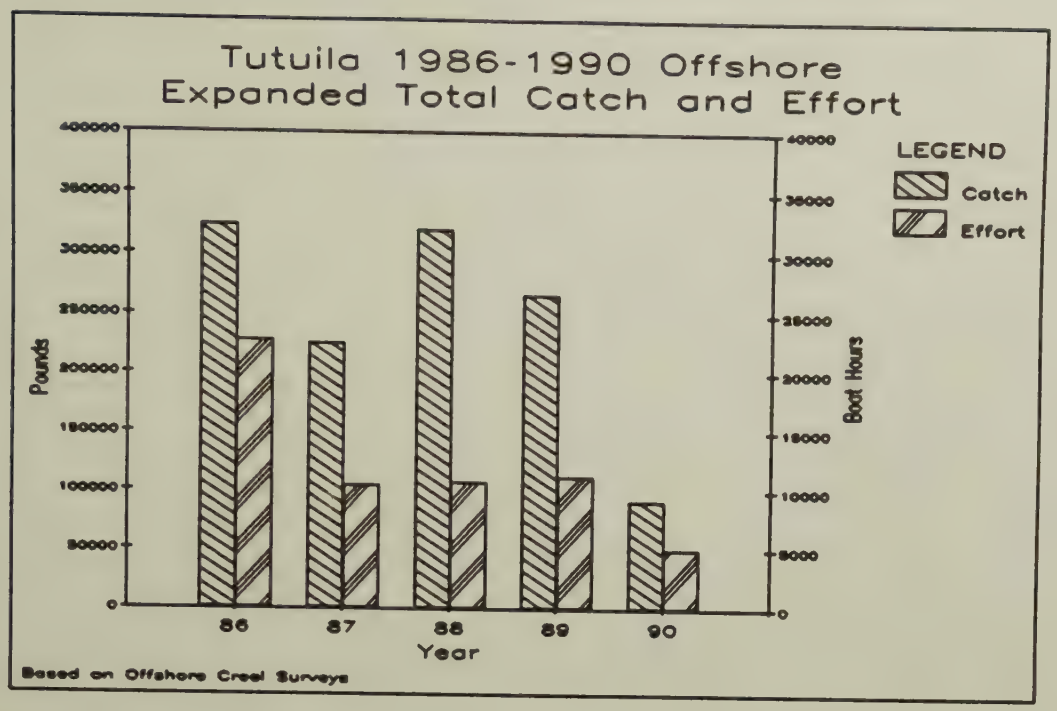


Figure II.5.3


Tutuila 1986-1990 Offshore
Expanded Total Catch and Effort
LEGEND
Catch
Effort
Pounds
Boat Hours
400000
350000
300000
250000
200000
150000
100000
50000
0
40000
35000
30000
25000
20000
15000
10000
5000
0
86
87
88
89
90
Year
Based on Offshore Creel Surveys

Commonwealth of the Northern Mariana Islands

Fishery Statistics 1990

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1990 FISHERY STATISTICS

Compiled by

Division of Fish and Wildlife

and the

Western Pacific Fishery Information Network

May 1992

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COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1990 FISHERY STATISTICS

INTRODUCTION

The Commonwealth of the Northern Mariana Islands (CNMI) comprises a string of islands located at about long. 145° E and extending northward from about lat. 14 to 21° N. About 99% of the approximately 21,000 inhabitants of the CNMI live on the three main islands, Saipan (87%), Rota (7%), and Tinian (5%). The Division of Fish and Wildlife (DFW) has been collecting fishery statistics on the commercial fishing fleet of Saipan since the mid-1970's. In 1983, DFW also began collecting information on vessels transshipping tuna out of Tinian. Significant improvements to the data collecting and processing systems were made in 1982 when microcomputer hardware, software, and training were provided by the WPACFIN program.

The major domestic commercial fishery of the CNMI is a small boat, one-day troll fishery. Most of the boats are 12- to 24-foot outboard-powered, runabout-type vessels; however, a few larger boats are also used. In the past few years, there has been a fairly rapid increase in the number of boats in the CNMI, about 70% of which are used in the commercial fisheries. Although trolling is by far the most common fishing method, many boats are also used for bottom fishing and reef fishing activities. Reef fish are an important component of the local diet and are a significant portion of the total commercial catch. Additionally, an increasing amount of reef fish is being imported from other Pacific islands to meet the local demand. In recent years, several larger boats have started fishing more intensively for bottom fish around the islands north of Saipan. The vast majority of the domestic catch is consumed locally, but there have been some exports of fish to Guam and Hawaii.

Beginning in 1983, fishing vessels from several nations began using the Tinian harbor as a port to off-load tuna catches to large transshipment vessels. In 1990, transshipments out of Tinian totaled 61,887 metric tons, of which 64% were made by 23 U.S. registered purse seiners.

DATA COLLECTING SYSTEM

The principal method used by DFW to collect domestic commercial fisheries data is a dealer invoicing system, sometimes referred to as a "trip ticket" system. The DFW provides numbered two-part invoices to all purchasers of fresh fishery products, including hotels, restaurants, stores, fish markets, and roadside vendors. Dealers complete an invoice each time they purchase fish directly from fishermen. They keep one copy for their records and provide one copy to DFW. Some advantages of this method of data

collection are that it is relatively inexpensive to implement and maintain, nearly complete coverage of the commercial fisheries is fairly easy to accomplish, and DFW can provide feedback to dealers and fishermen to ensure data accuracy and continued cooperation. Disadvantages include a dependence on non-DFW personnel to identify the catch and record the data, the types of data that can be collected are somewhat restricted, education and cooperation of all fish purchasers are required, and only the fish that are actually sold to dealers are recorded and a potentially important portion of the total landings is unrecorded. Since 1982, DFW has tried to minimize these disadvantages as much as possible by maintaining a close working relationship with dealers, by educating and adding new dealers to their list as they enter the business, and by implementing a creel survey to help estimate total catch, including recreational and subsistence catch.

The current system collects data from dealers on the island of Saipan, where DFW estimates over 90% of all CNMI commercial landings are made. The DFW further estimates that the proportion of total commercial landings that is recorded in the data base for Saipan since 1983 is over 90%.

Information collected for each commercial purchase of fish from the fishermen includes the following:

Date
Buyer's name (dealer)
Seller's name (fisherman)
Species
Weight (pounds)
Price per pound
Value
Invoice number

All of these data elements are collected for all purchases of fishery products; however, species identification is frequently made only to a group level, especially for reef fish.

DATA PROCESSING SYSTEM

At the beginning of each month, a DFW employee visits each of the dealers on Saipan to obtain the previous month's invoices, resolve problems, and answer any questions the dealer may have. The invoices are returned to the office for an initial visual edit during the coding process, and are then entered into the "Purchase" data base on the microcomputer. After the records are entered, reports are generated to help verify that all data were entered correctly. On a quarterly basis, copies of the data base are sent to the Honolulu Laboratory, where the data are translated into a different format and transferred to the central computer for additional editing and verification before generation of summary reports. These reports and databases are then ready for use by qualified WPACFIN participants.

DATA REPORTING SYSTEM

After all editing and quality control activities have been accomplished, monthly and annual summary reports by species are generated. Each of the following reports for 1990 contains information on the pounds, value, average price per pound, and number of recorded landings for each species or species groups. The number of recorded landings ("RECORDS" in the tables) is a measurement of how many times each species was landed, regardless of the number or weight of the fish in the landing. This statistic is provided to give an indication of the frequency each species is reported. The POUNDS can be divided by the RECORDS for the average weight of each landing. Each monthly report contains a subtotal for the sum of all species for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

The following species, species groups, and abbreviations are used in the tables and graphs of CNMI's data:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Marlin
Shortbill spearfish
Sailfish
Wahoo
Sharks

II. Bottomfish Management Unit Species (BMUS)

Jacks (unclassified, but excluding bigeye scad)
Bottom fish (unclassified)
Ehu (red snapper)
Gindai (flower snapper)
Grouper (unclassified)
Kalikali (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Opakapaka (pink snapper)
Uku (gray snapper)
Emperorfish

III. Billfish

Marlin (probably all blue marlin but could also include the rarely landed striped and black marlin)
Shortbill spearfish
Sailfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna

Yellowfin tuna
Dogtooth tuna

V. Other Tuna

The above tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

Same as BMUS

C. Reef Fish

Reef fish (unclassified)
Giant wrasse
Rabbitfish (hitting, hitting feda, menahac, and sesjun)
Rudderfish
Squirrelfish
Parrotfish
Snapper
Surgeonfish
Unicornfish
Goatfish

D. Other

Miscellaneous
Bigeye scad
Mullet
Eels
Milkfish
Invertebrates (unclassified)
Crabs (unclassified)
Coconut crab
Lobster
Shrimp
Octopus
Squid
Turtle
Seaweeds
Imported

Table III.1.1

CNMI 1990 Annual Commercial Landings

Species	Pounds	Value	$/lb
Assorted	79	134	1.70
Bigeye scad (atulai)	3,937	8,584	2.18
Mullet	15	35	2.35
Bottom fish	5,624	11,407	2.03
Gindai (flower snap)	314	1,012	3.22
Grouper	542	1,471	2.71
Onaga (red snapper)	202	1,114	5.51
Opakapaka (pink snp)	502	1,464	2.91
Reef fish	172,151	271,915	1.58
Wrasse	27	54	2.00
Rabbitfish (hitting)	4,595	10,077	2.19
Rudderfish (guilli)	805	1,801	2.24
Emperor (mafute)	3,719	9,855	2.65
Parrotfish	4,007	7,920	1.98
Surgeonfish	3,467	5,788	1.67
Unicornfish	1,652	2,693	1.63
Goatfish	1,204	2,643	2.20
Troll fish	226	678	3.00
Barracuda	398	703	1.77
Dolphin (mahimahi)	8,306	17,285	2.08
Marlin	1,748	2,012	1.15
Rainbow runner	173	396	2.29
Wahoo	2,770	6,449	2.33
Skipjack tuna	118,798	177,921	1.50
Dogtooth tuna	4,070	9,222	2.27
Yellowfin tuna	8,374	20,854	2.49
Lobster	3,895	14,338	3.68
Octopus	59	103	1.75
Squid	61	128	2.10
** TOTAL **	351,719	588,055	1.67

Table III.1.2

CNMI January 1990 Commercial Landings

Species	Pounds	Value	$/lb
Assorted	79	134	1.70
Bottom fish	935	1,634	1.75
Reef fish	19,804	29,833	1.51
Rabbitfish (hitting)	150	300	2.00
Emperor (mafute)	25	44	1.75
Parrotfish	142	351	2.48
Surgeonfish	430	688	1.60
Dolphin (mahimahi)	564	1,146	2.03
Marlin	567	496	0.88
Wahoo	366	945	2.58
Skipjack tuna	3,384	4,956	1.46
Dogtooth tuna	208	573	2.75
Yellowfin tuna	183	525	2.87
Lobster	268	970	3.62
Octopus	59	103	1.75
** SUBTOTAL **	27,164	42,697	1.57

Table III.1.3

CNMI February 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	156	392	2.51
Bottom fish	608	1,229	2.02
Reef fish	7,835	12,698	1.62
Rabbitfish (hitting)	393	910	2.32
Parrotfish	238	381	1.60
Surgeonfish	236	378	1.60
Barracuda	220	406	1.85
Dolphin (mahimahi)	1,832	3,773	2.06
Wahoo	32	39	1.25
Skipjack tuna	7,750	11,610	1.50
Dogtooth tuna	81	130	1.60
Yellowfin tuna	441	1,103	2.50
** SUBTOTAL **	19,821	33,048	1.67

Table III.1.4

CNMI March 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	461	1,133	2.46
Bottom fish	736	1,262	1.71
Opakapaka (pink snp)	67	214	3.18
Reef fish	27,586	43,053	1.56
Rabbitfish (hitting)	1,259	2,877	2.29
Rudderfish (guilli)	35	79	2.25
Emperor (mafute)	111	333	3.00
Parrotfish	755	1,571	2.08
Surgeonfish	643	1,077	1.67
Barracuda	44	75	1.70
Dolphin (mahimahi)	1,563	3,115	1.99
Wahoo	427	1,012	2.37
Skipjack tuna	12,196	20,237	1.66
Dogtooth tuna	491	1,397	2.85
Yellowfin tuna	357	1,127	3.16
Lobster	66	231	3.49
** SUBTOTAL **	46,798	78,794	1.68

Table III.1.5

CNMI April 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	85	191	2.25
Bottom fish	288	544	1.89
Gindai (flower snap)	140	490	3.50
Grouper	114	314	2.75
Onaga (red snapper)	98	539	5.50
Opakapaka (pink snp)	292	866	2.97
Reef fish	18,409	28,880	1.57
Rabbitfish (hitting)	512	1,133	2.22
Rudderfish (guilli)	204	449	2.20
Emperor (mafute)	325	859	2.64
Parrotfish	114	350	3.06
Surgeonfish	600	960	1.60
Unicornfish	41	82	2.00
Goatfish	43	80	1.85
Troll fish	226	678	3.00
Barracuda	120	204	1.70
Dolphin (mahimahi)	1,828	3,743	2.05
Wahoo	838	1,963	2.34
Skipjack tuna	14,806	20,980	1.42
Dogtooth tuna	129	246	1.91
Yellowfin tuna	274	735	2.69
Lobster	763	2,805	3.68
** SUBTOTAL **	40,248	67,090	1.67

Table III.1.6

CNMI May 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	37	65	1.75
Bottom fish	190	327	1.73
Gindai (flower snap)	174	522	3.00
Opakapaka (pink snp)	17	51	3.00
Reef fish	13,224	20,755	1.57
Rabbitfish (hitting)	306	700	2.29
Rudderfish (guilli)	100	225	2.25
Emperor (mafute)	306	895	2.93
Surgeonfish	183	293	1.60
Unicornfish	159	254	1.60
Dolphin (mahimahi)	300	824	2.75
Marlin	134	281	2.09
Wahoo	172	449	2.61
Skipjack tuna	12,998	17,861	1.37
Dogtooth tuna	188	348	1.85
Yellowfin tuna	258	589	2.28
Lobster	169	723	4.27
** SUBTOTAL **	28,914	45,161	1.56

Table III.1.7

CNMI June 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bottom fish	530	1,094	2.07
Opakapaka (pink snp)	75	180	2.40
Reef fish	16,238	25,895	1.59
Rabbitfish (hitting)	331	723	2.19
Rudderfish (guilli)	93	209	2.25
Emperor (mafute)	722	1,923	2.66
Parrotfish	83	158	1.90
Surgeonfish	363	581	1.60
Dolphin (mahimahi)	174	290	1.67
Rainbow runner	7	18	2.50
Skipjack tuna	14,030	18,989	1.35
Dogtooth tuna	469	758	1.62
Yellowfin tuna	662	1,282	1.94
Lobster	952	3,333	3.50
Squid	61	128	2.10
** SUBTOTAL **	34,790	55,561	1.60

Table III.1.8

CNMI July 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	66	165	2.50
Bottom fish	396	875	2.21
Grouper	16	48	3.00
Onaga (red snapper)	90	540	6.00
Opakapaka (pink snp)	51	153	3.00
Reef fish	19,183	30,538	1.59
Rabbitfish (hitting)	165	340	2.07
Emperor (mafute)	547	1,560	2.85
Parrotfish	393	629	1.60
Barracuda	14	18	1.25
Marlin	497	685	1.38
Rainbow runner	18	45	2.50
Wahoo	31	70	2.25
Skipjack tuna	6,988	10,905	1.56
Dogtooth tuna	505	953	1.89
Yellowfin tuna	411	975	2.37
Lobster	1,438	5,446	3.79
** SUBTOTAL **	30,806	53,945	1.75

Table III.1.9

CNMI August 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	183	366	2.00
Mullet	15	35	2.35
Bottom fish	60	105	1.75
Reef fish	9,199	14,637	1.59
Rabbitfish (hitting)	435	808	1.86
Rudderfish (guilli)	184	414	2.25
Emperor (mafute)	1,125	2,839	2.52
Parrotfish	53	106	2.00
Surgeonfish	189	302	1.60
Goatfish	424	996	2.35
Marlin	420	420	1.00
Wahoo	68	169	2.50
Skipjack tuna	12,777	21,631	1.69
Dogtooth tuna	295	617	2.09
Yellowfin tuna	730	2,124	2.91
Lobster	50	175	3.50
** SUBTOTAL **	26,207	45,745	1.75

Table III.1.10

CNMI September 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	1,408	3,102	2.20
Bottom fish	89	178	2.00
Grouper	117	289	2.47
Onaga (red snapper)	14	35	2.50
Reef fish	14,123	23,400	1.66
Wrasse	27	54	2.00
Rabbitfish (hitting)	335	747	2.23
Rudderfish (guilli)	189	425	2.25
Emperor (mafute)	550	1,377	2.50
Parrotfish	636	1,117	1.76
Surgeonfish	20	40	2.00
Unicornfish	83	166	2.00
Goatfish	737	1,568	2.13
Wahoo	105	210	2.00
Skipjack tuna	17,058	25,655	1.50
Dogtooth tuna	680	1,865	2.74
Yellowfin tuna	2,714	6,113	2.25
Lobster	126	441	3.50
** SUBTOTAL **	39,011	66,781	1.71

Table III.1.11

CNMI October 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	780	1,634	2.10
Bottom fish	369	766	2.08
Grouper	32	90	2.80
Reef fish	9,622	15,576	1.62
Rabbitfish (hitting)	334	694	2.08
Parrotfish	18	36	2.00
Surgeonfish	191	306	1.60
Unicornfish	781	1,250	1.60
Dolphin (mahimahi)	110	193	1.75
Marlin	130	130	1.00
Wahoo	158	351	2.22
Skipjack tuna	10,790	15,254	1.41
Dogtooth tuna	529	1,078	2.04
Yellowfin tuna	837	1,935	2.31
Lobster	36	120	3.33
** SUBTOTAL **	24,717	39,411	1.59

Table III.1.12

CNMI November 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	387	677	1.75
Bottom fish	1,178	2,899	2.46
Grouper	164	459	2.80
Reef fish	5,000	7,651	1.53
Parrotfish	780	1,248	1.60
Unicornfish	588	941	1.60
Dolphin (mahimahi)	327	764	2.33
Wahoo	216	486	2.25
Skipjack tuna	1,764	2,906	1.65
Dogtooth tuna	407	1,035	2.54
Yellowfin tuna	1,222	3,620	2.96
** SUBTOTAL **	12,033	22,684	1.89

Table III.1.13

CNMI December 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	374	860	2.30
Bottom fish	247	494	2.00
Grouper	99	272	2.75
Reef fish	11,928	18,999	1.59
Rabbitfish (hitting)	377	843	2.24
Emperor (mafute)	8	25	3.00
Parrotfish	795	1,974	2.48
Surgeonfish	612	1,164	1.90
Dolphin (mahimahi)	1,608	3,438	2.14
Rainbow runner	148	333	2.25
Wahoo	358	756	2.11
Skipjack tuna	4,256	6,937	1.63
Dogtooth tuna	89	223	2.50
Yellowfin tuna	286	728	2.55
Lobster	27	93	3.50
** SUBTOTAL **	21,211	37,138	1.75
** TOTAL **	351,719	588,055	1.67

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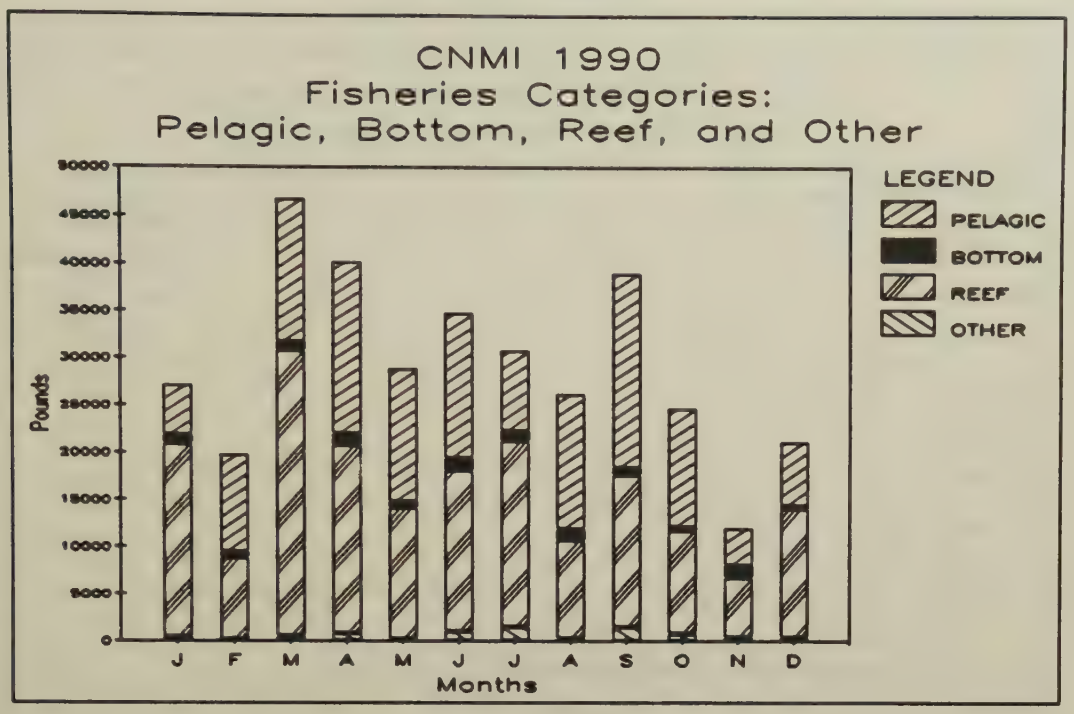

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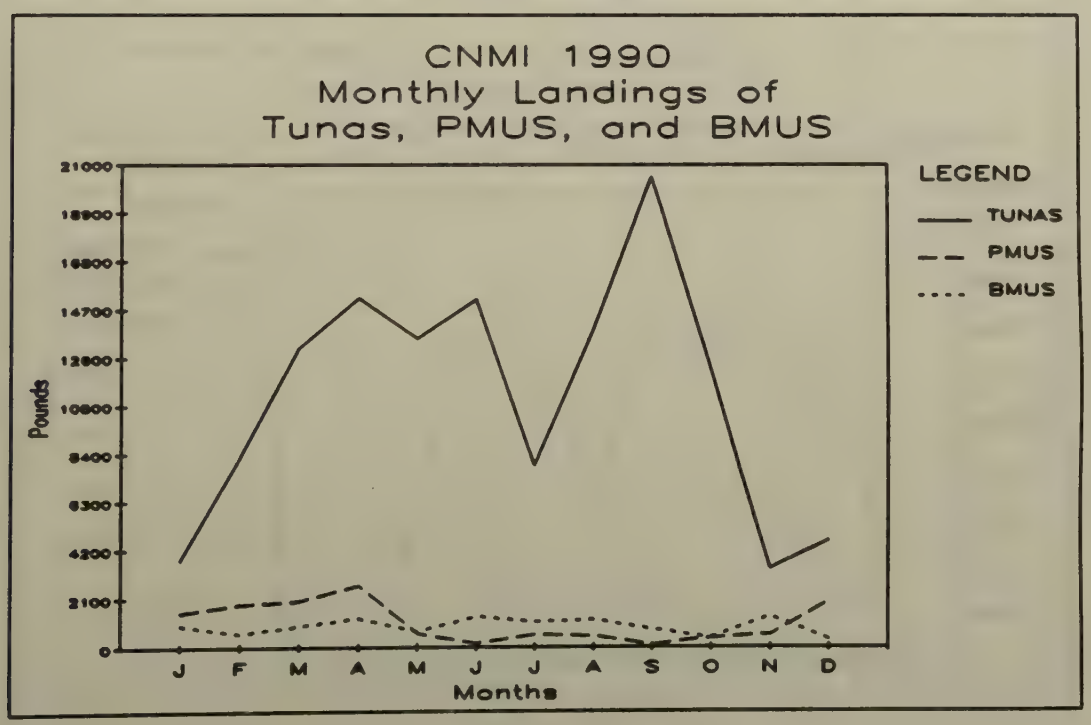

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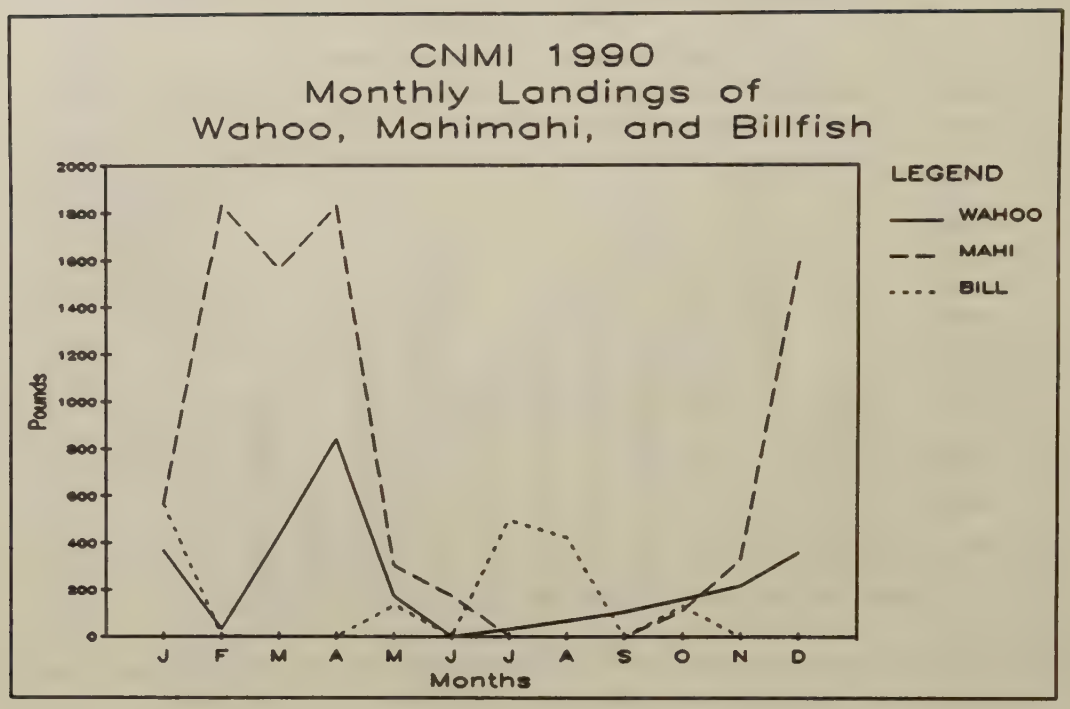

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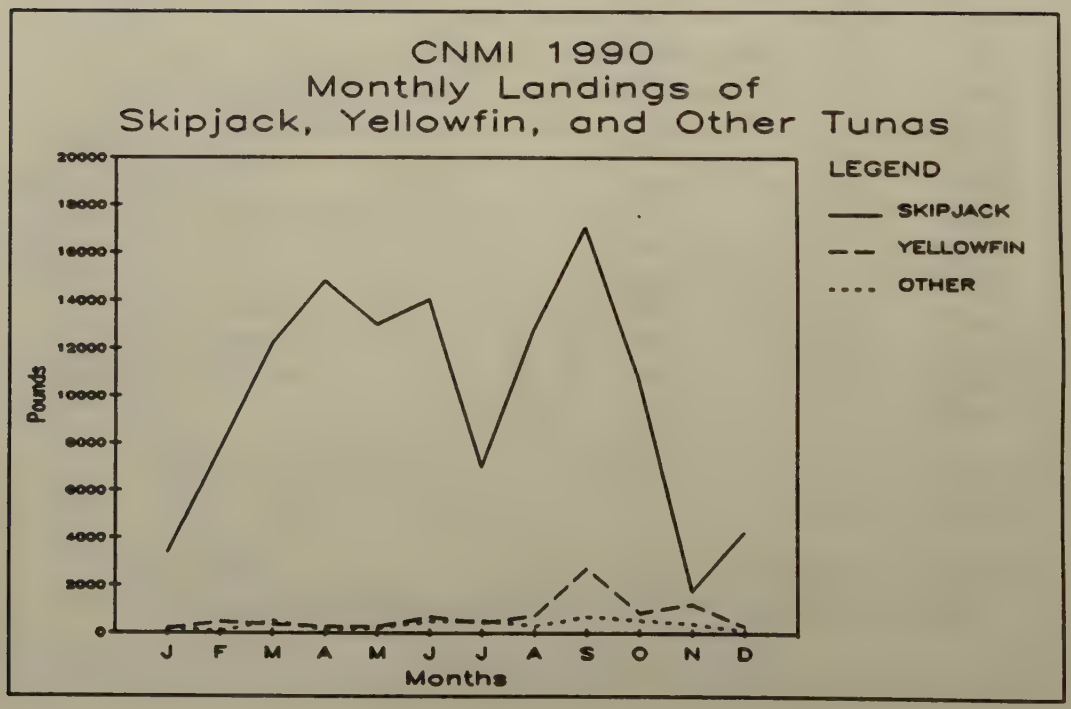

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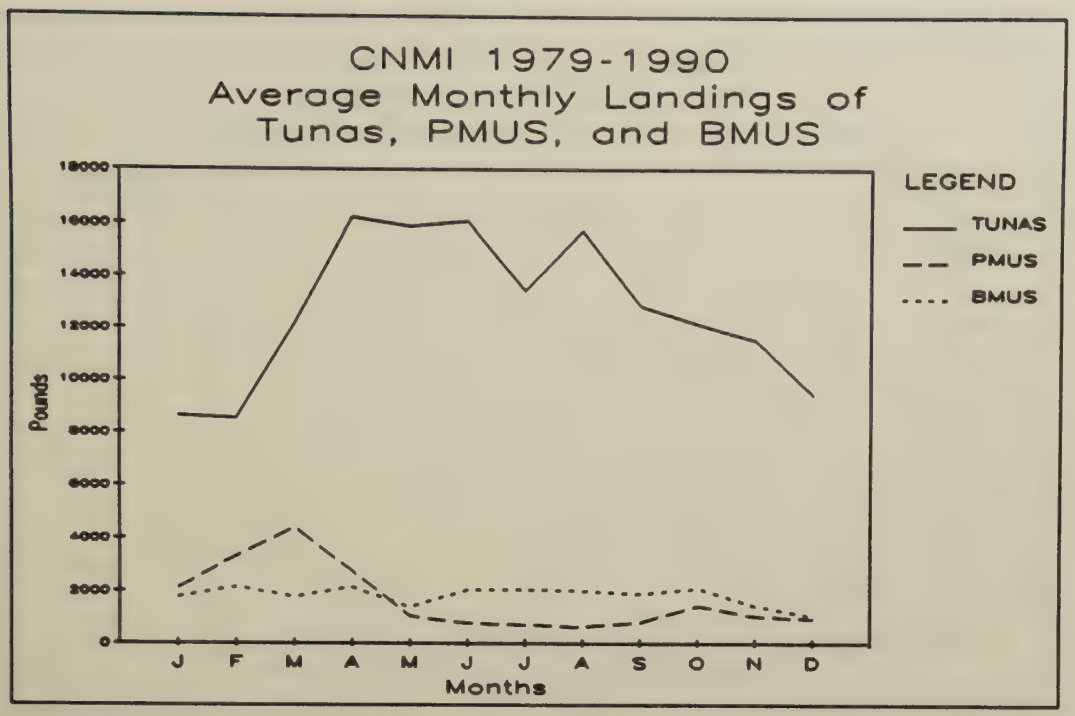

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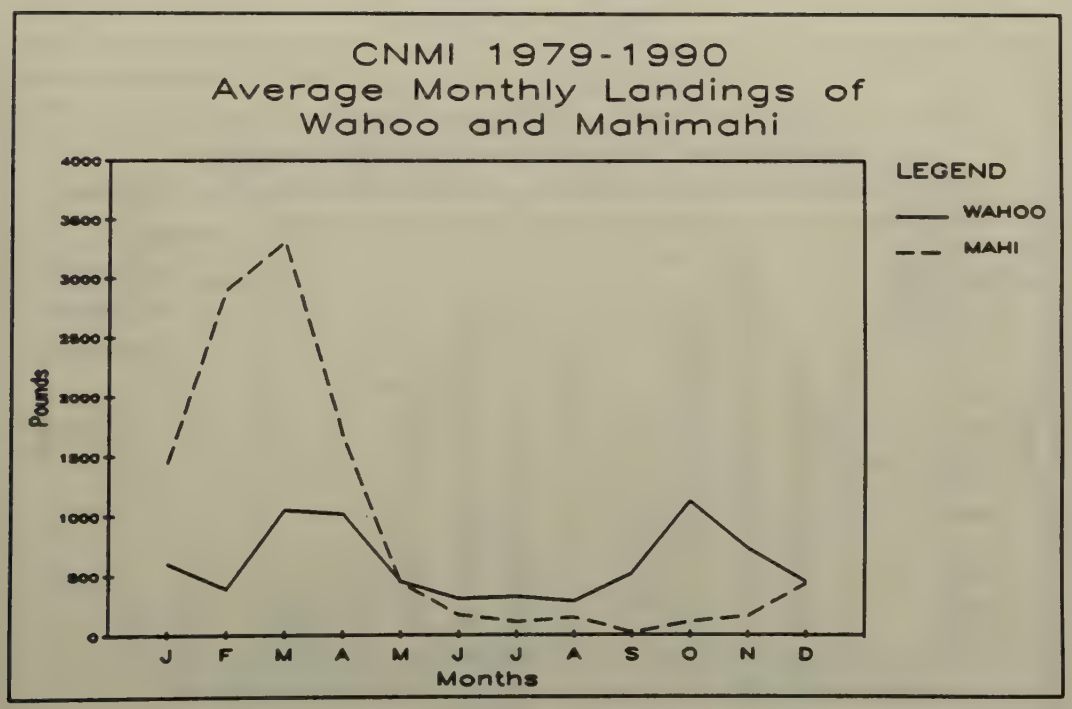

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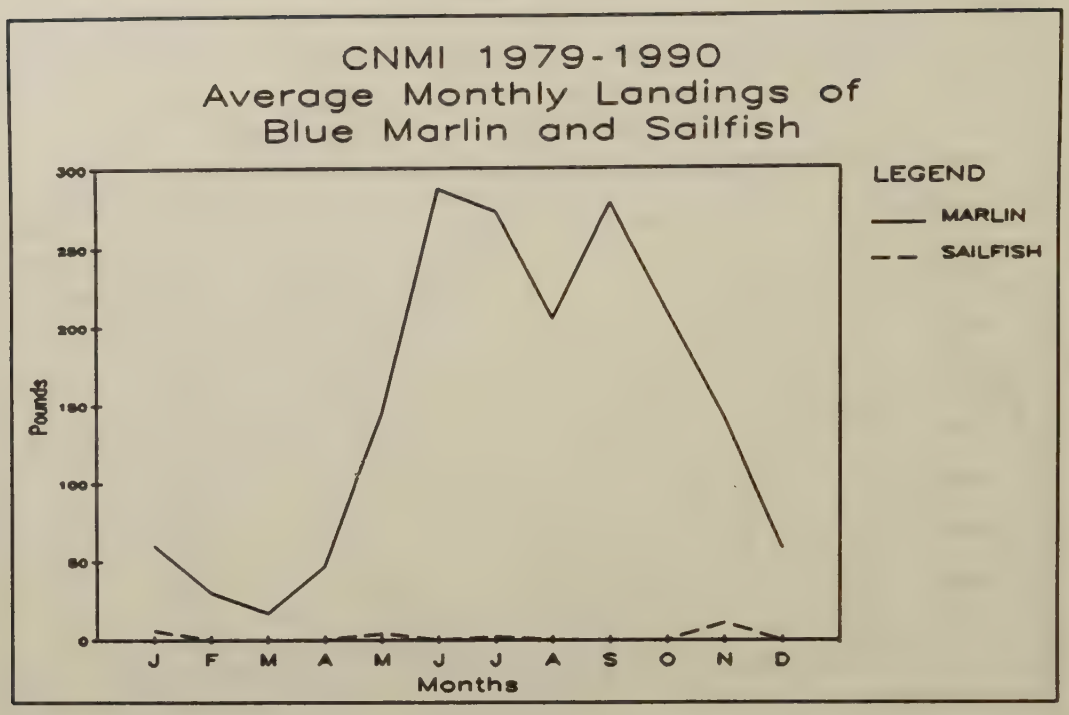

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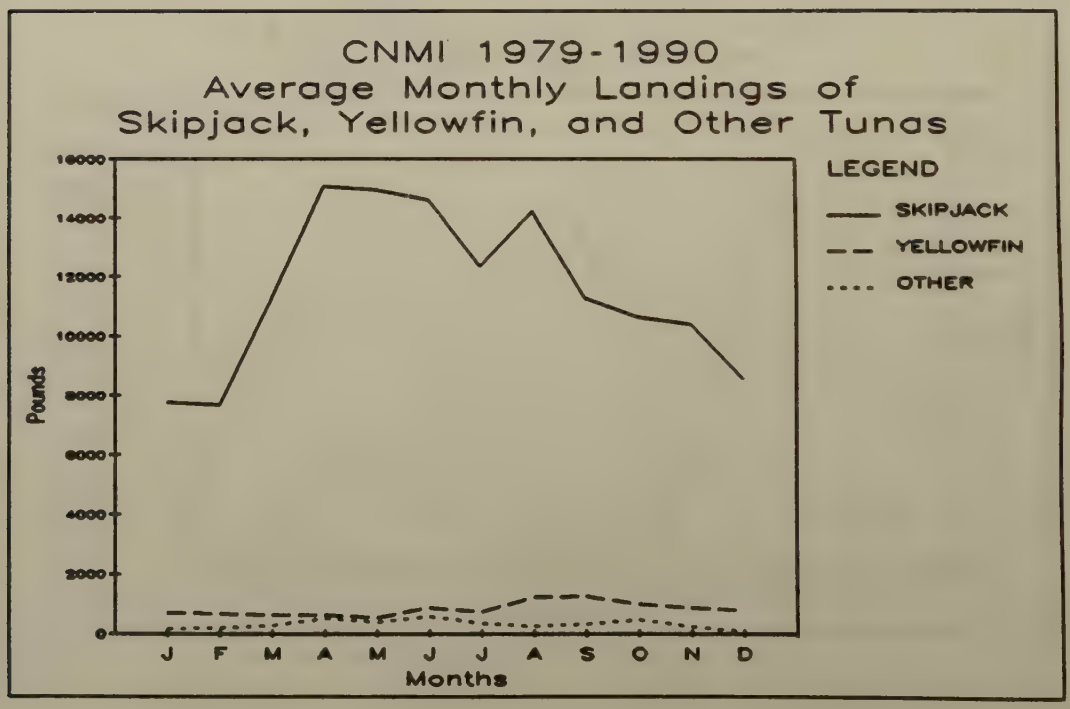

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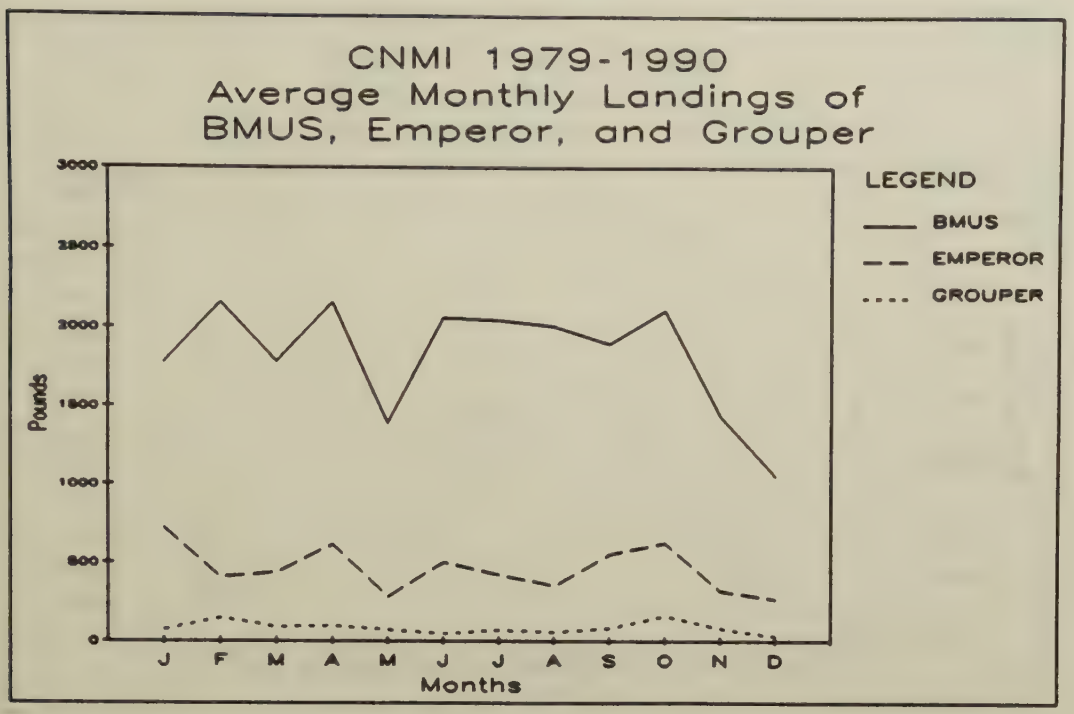

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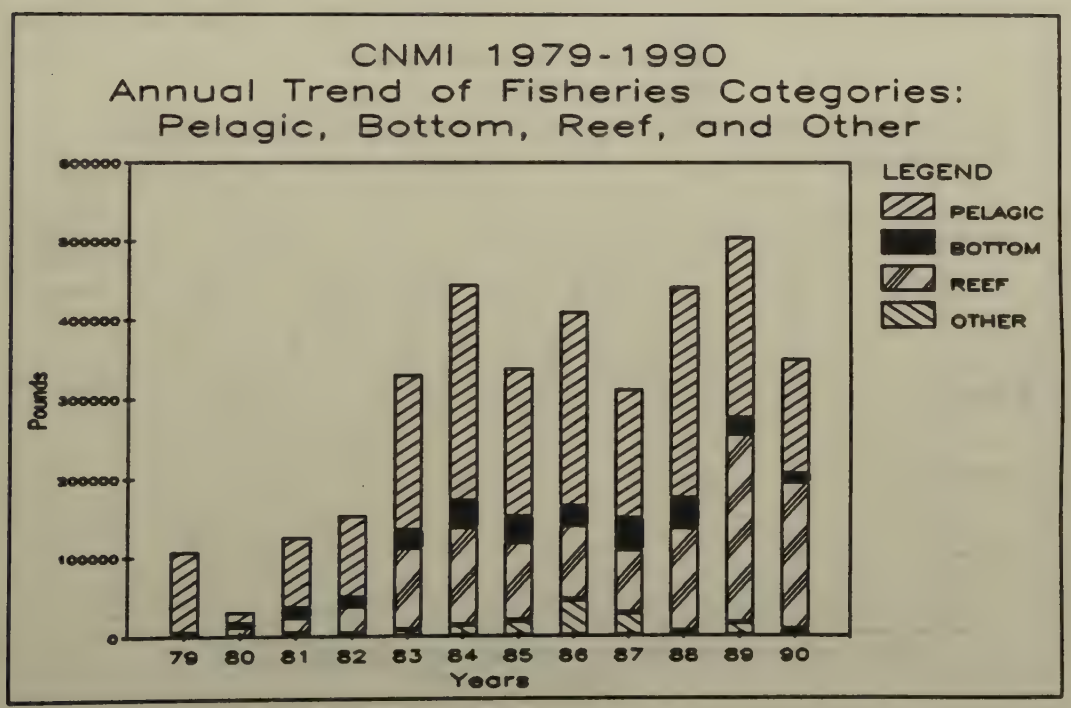

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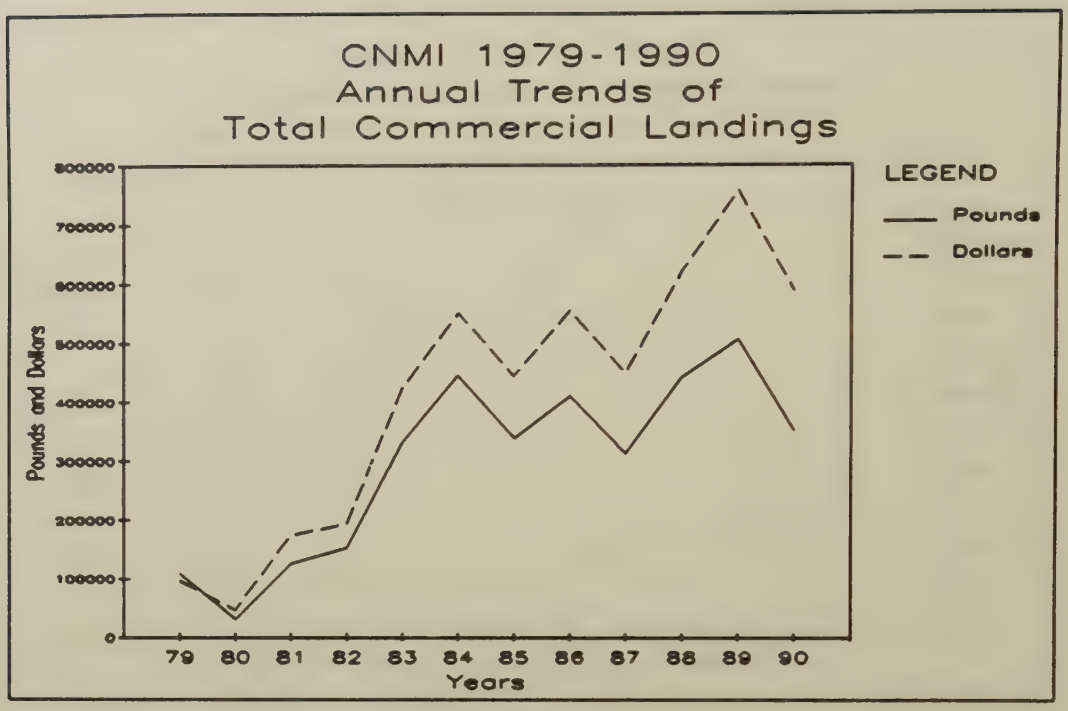

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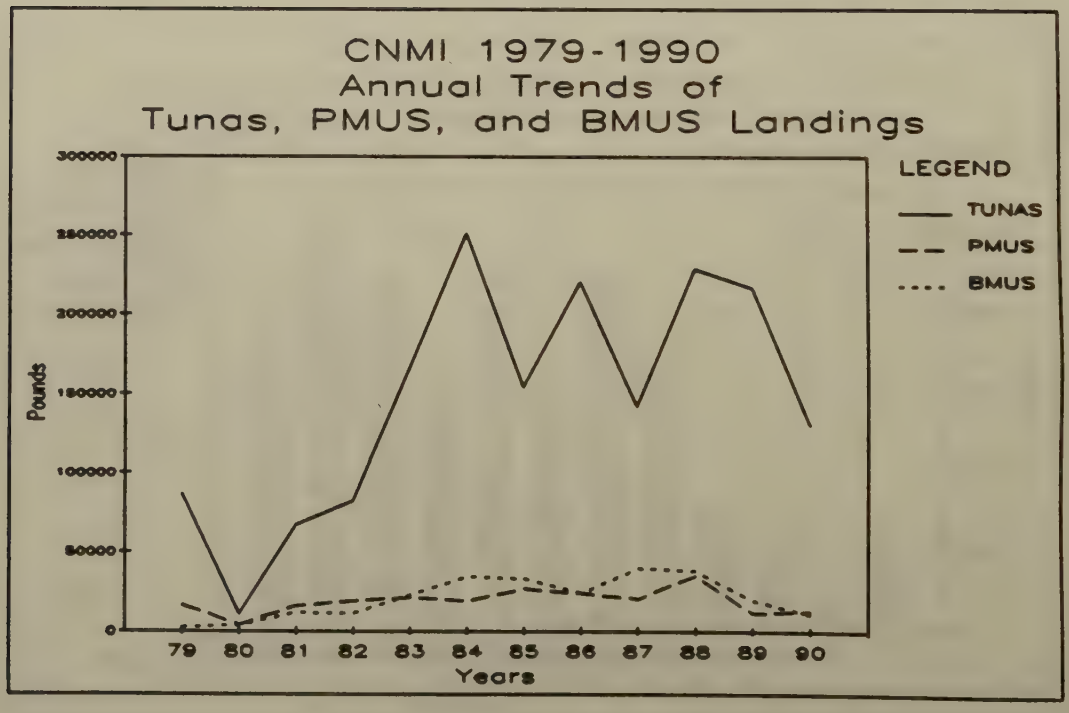

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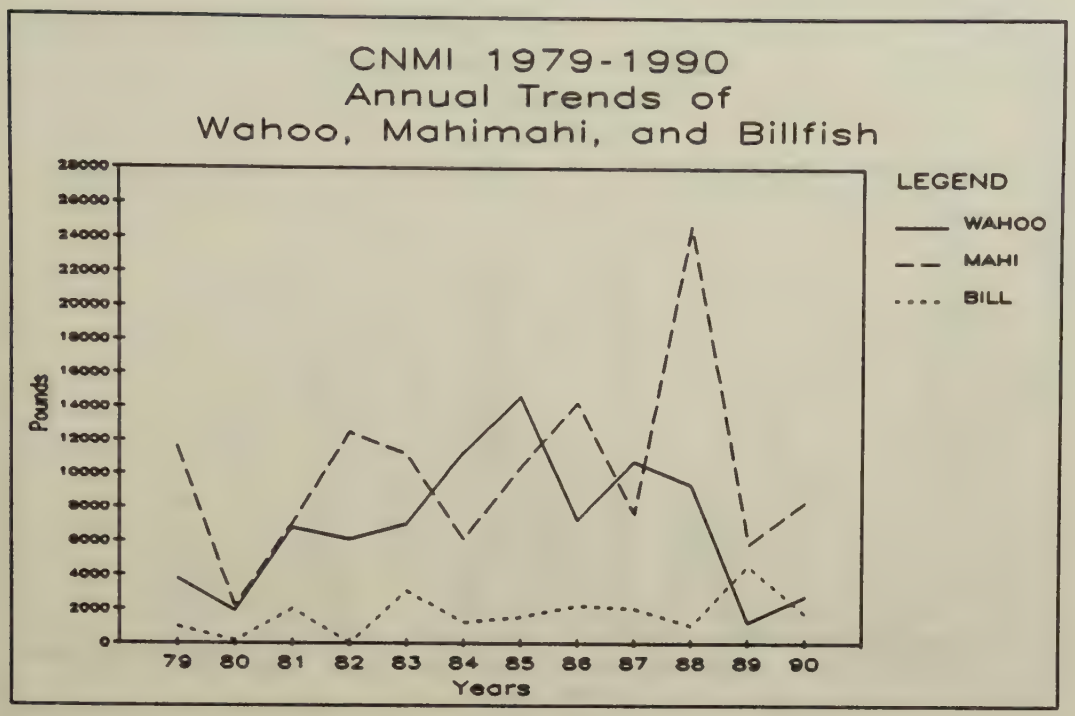

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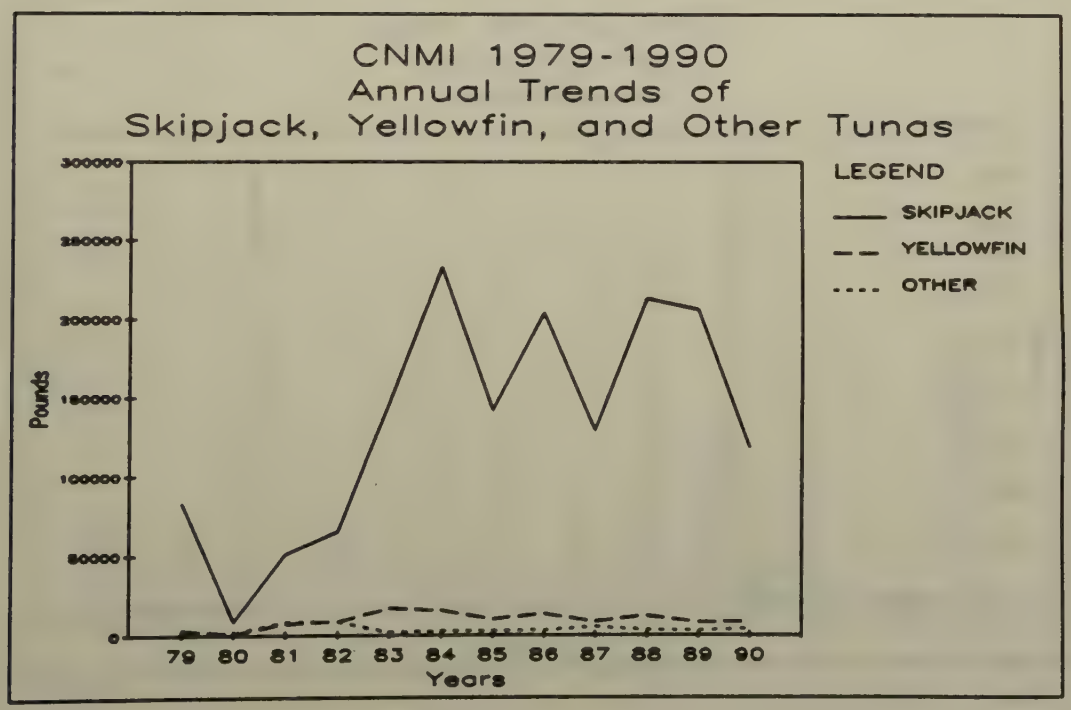

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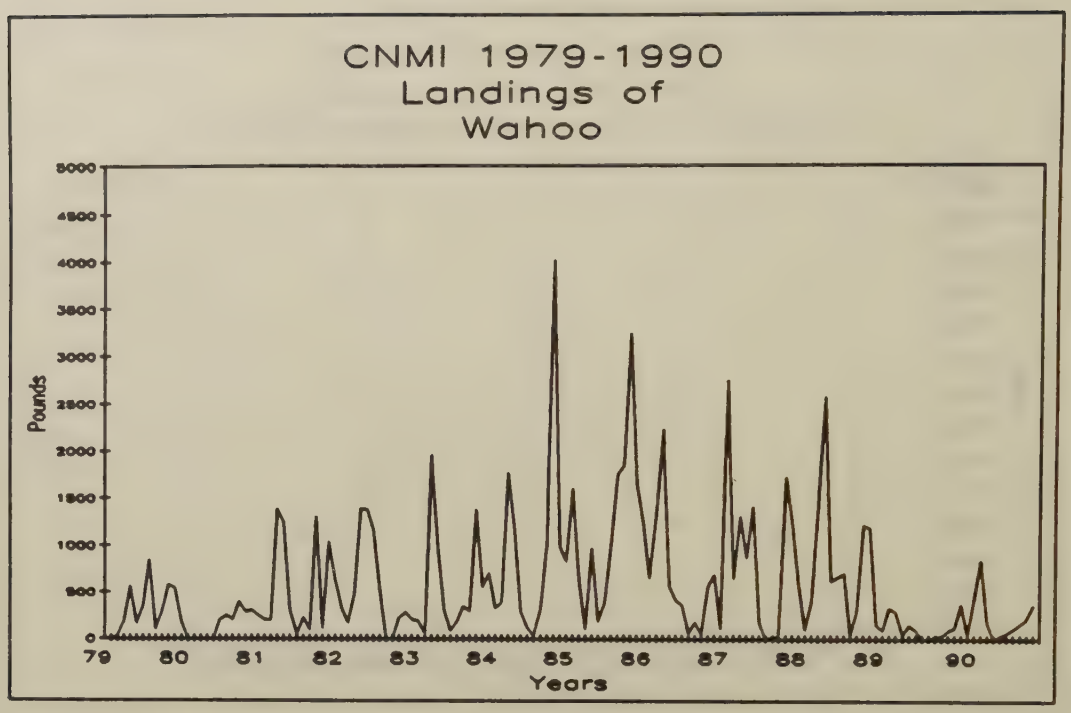

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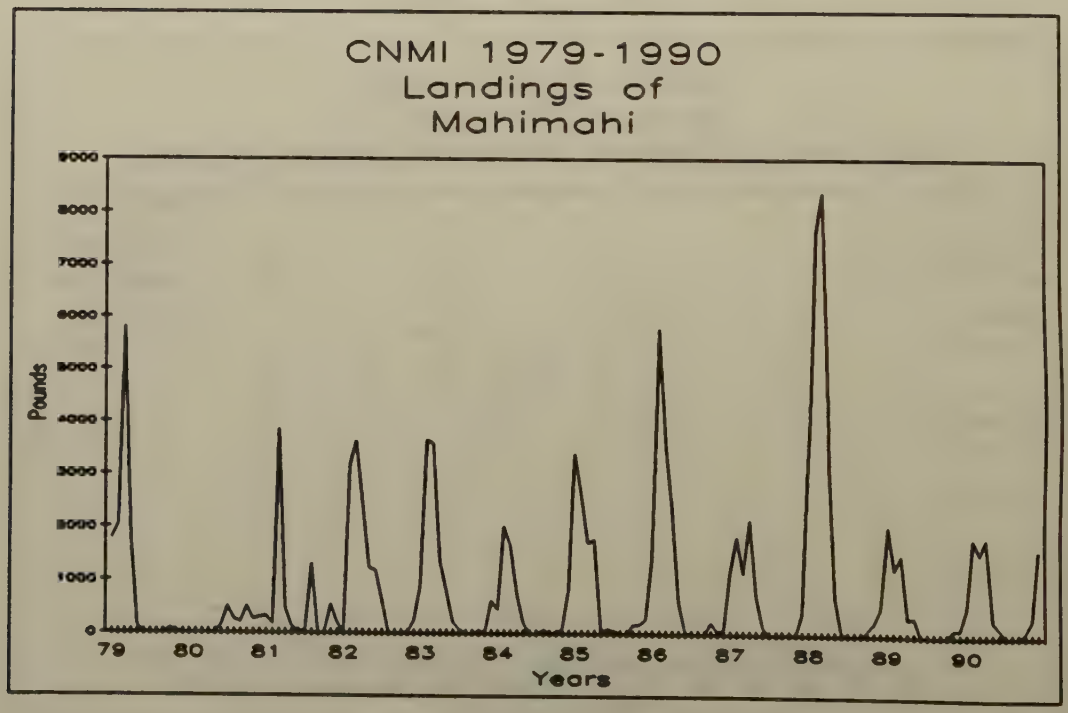

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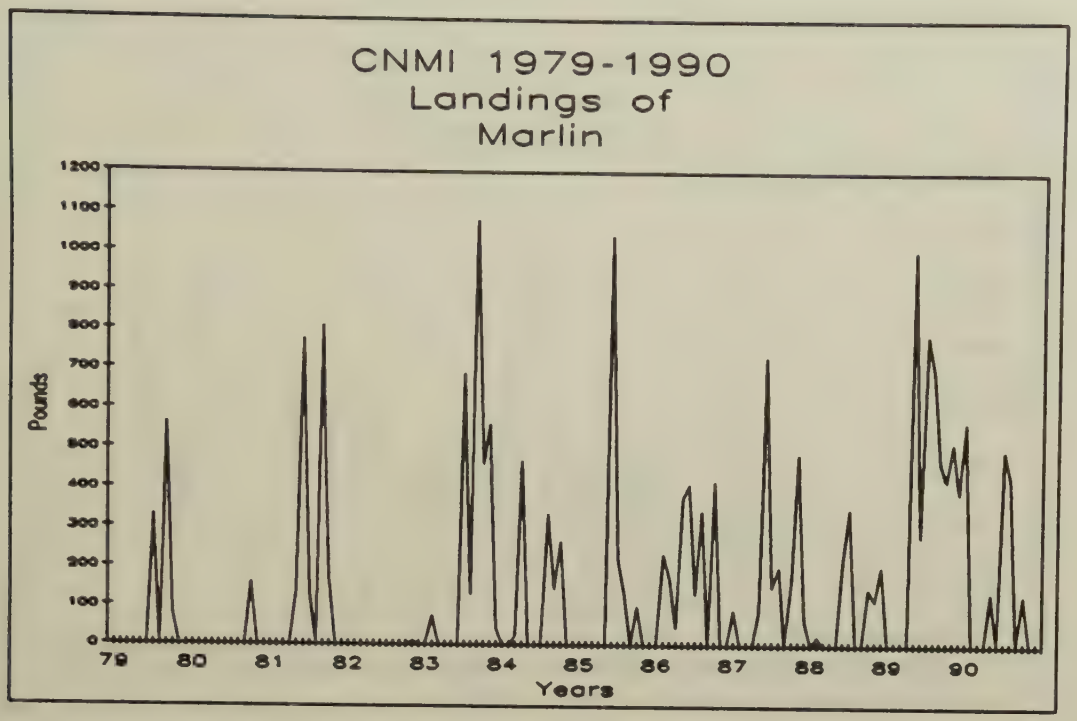

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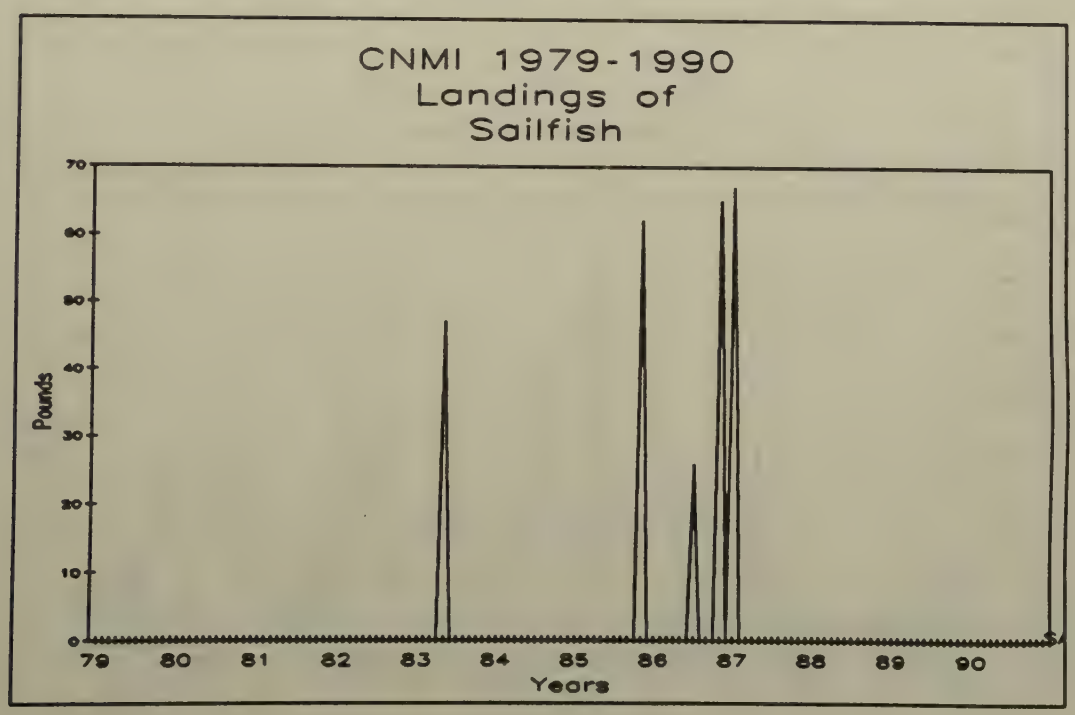

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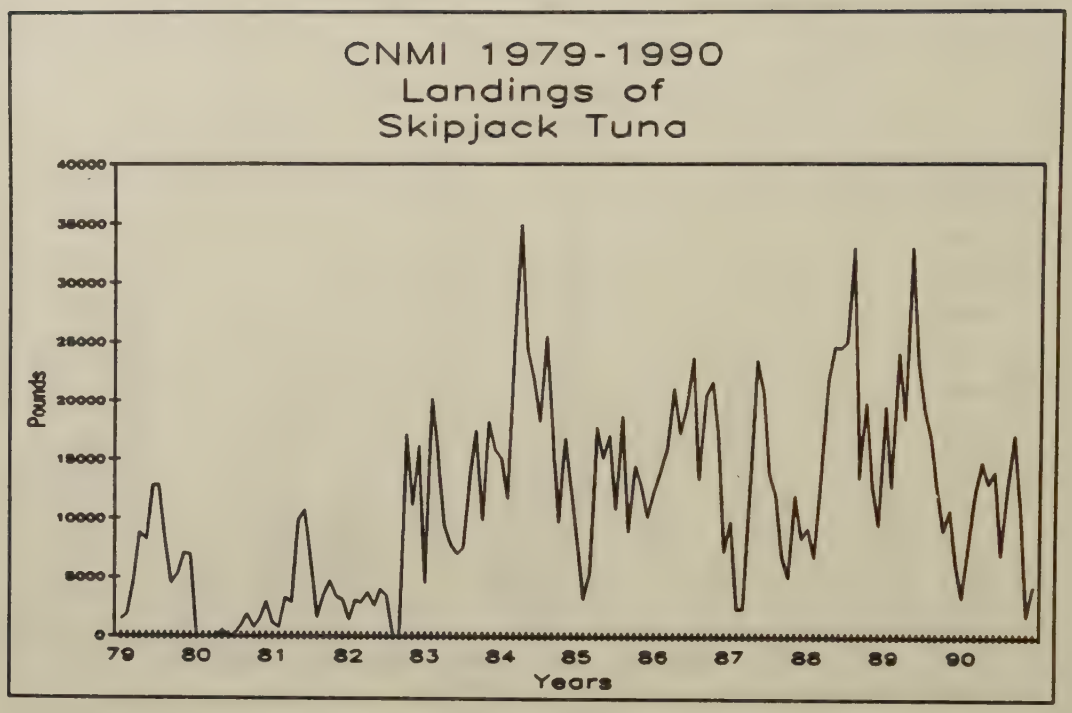

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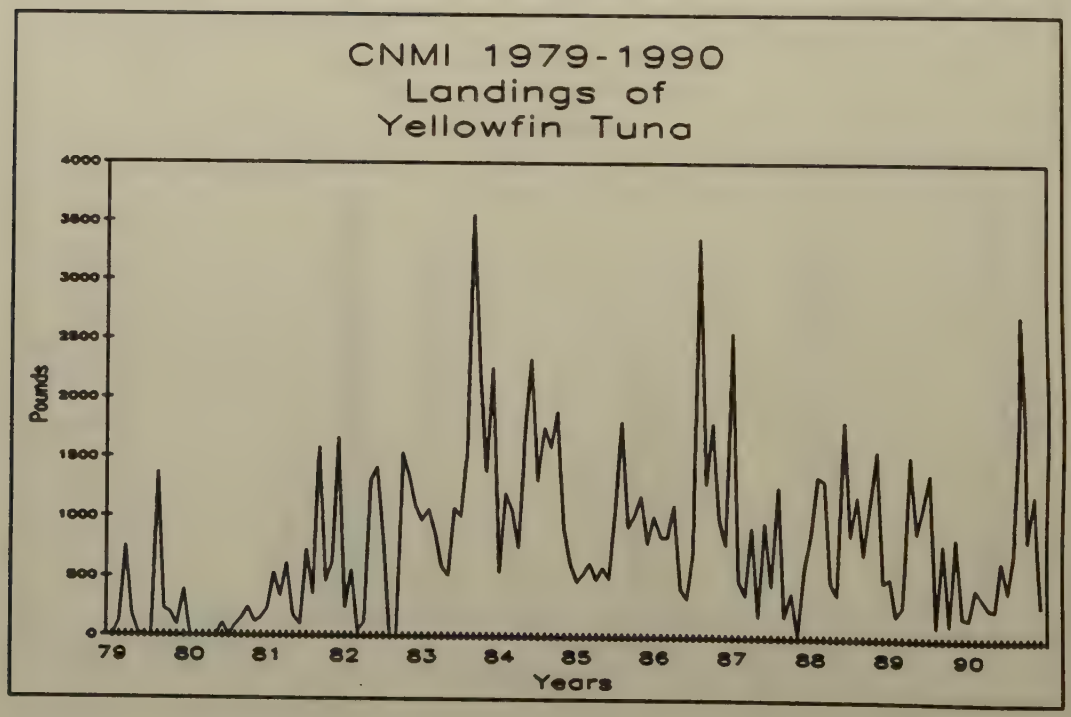

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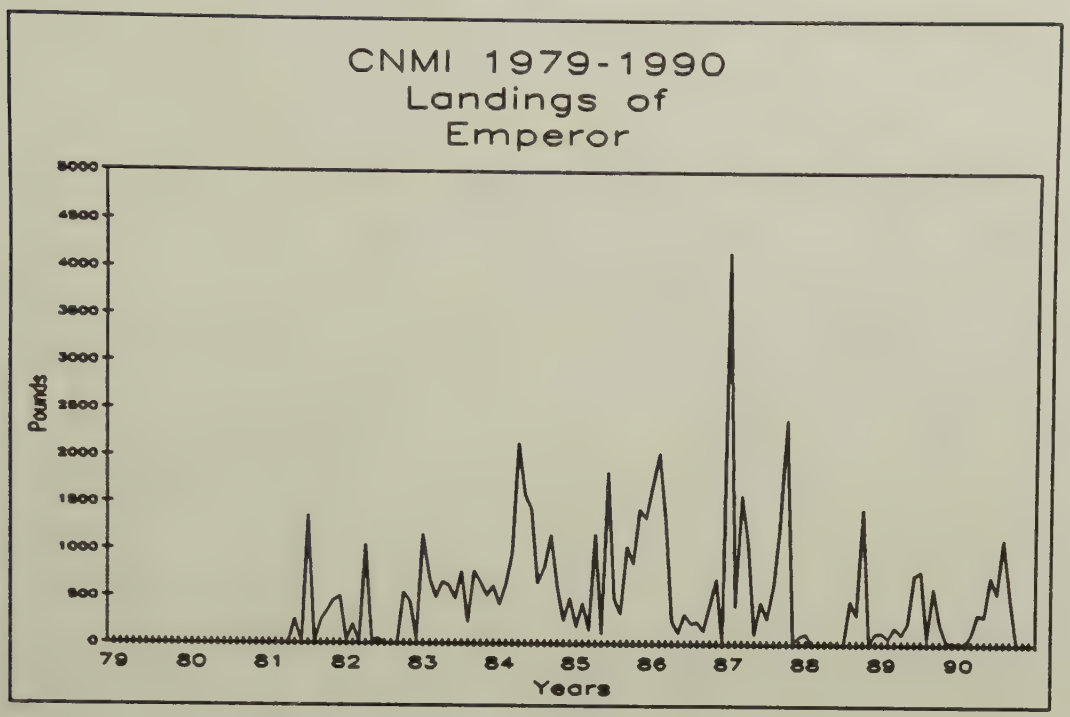

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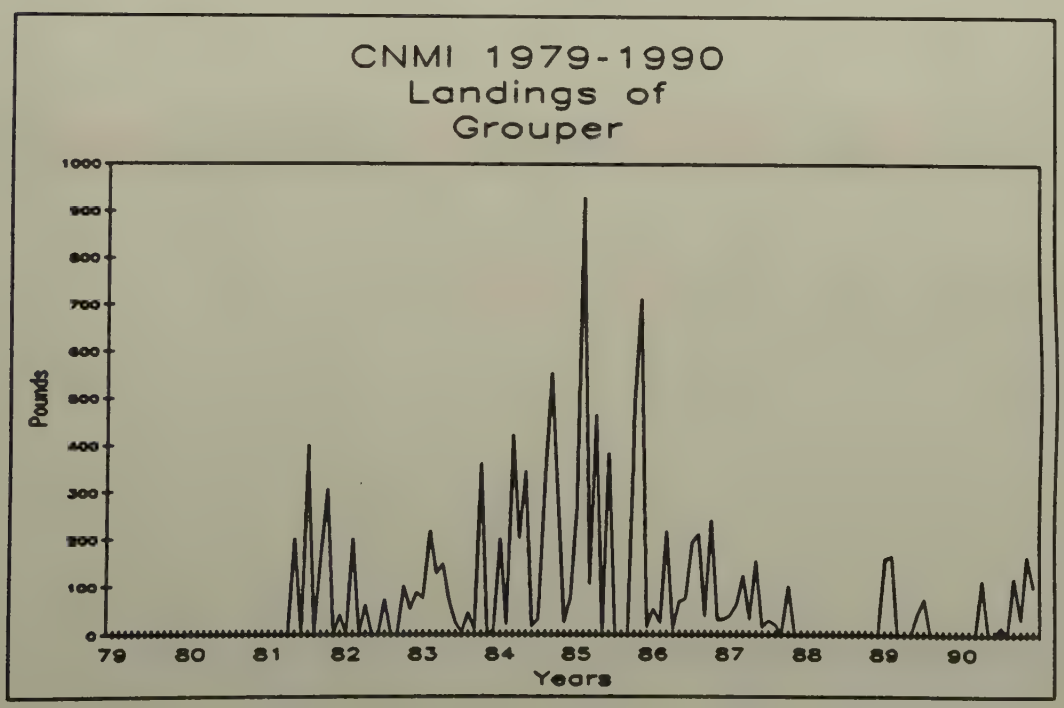

Territory of Guam

Fishery Statistics
1990

GUAM 1990 FISHERY STATISTICS

Compiled by

Guam Division of Aquatic and Wildlife Resources

and the

Western Pacific Fishery Information Network

May 1992

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GUAM 1990 FISHERY STATISTICS

INTRODUCTION

The Territory of Guam (lat. 13.4° N and long. 144.4° E) is the southernmost, largest, and most populous island in the Mariana Archipelago. All of the islands in the chain north of Guam belong to the Commonwealth of the Northern Mariana Islands. Guam is located about 6,000 km (3,700 mi) west-southwest of Honolulu, 2,500 km (1,550 mi) south-southeast of Tokyo, and 2,600 km (1,600 mi) east of Manila. Guam is about 48 km (30 mi) long, varies from 6 to 14 km (4 to 9 mi) wide, and has an estimated land area of 554 km^2 (214 mi^2) and a population of about 120,000.

Fishing activities on Guam can be divided into two basic categories: offshore and inshore fishing. Offshore fishing typically involves small boat (12 to 48 feet), 1 to 2-day trolling and bottom fishing trips that usually originate from one of the three principal harbors located on the west coast and southern tip of the island. Inshore fishing is typically conducted without the use of a boat and consists mostly of nearshore casting, netting, and spearfishing. The Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) has been conducting offshore and inshore creel surveys since the early 1970's. Beginning in 1982, DAWR began modifying its data collecting and processing systems to improve estimates of catch and effort by improving sampling techniques and by incorporating the use of microcomputers to expand the survey data. The WPACFIN provided microcomputers and training and worked with DAWR staff and a contractor to redesign the sampling program. In 1982, WPACFIN also began working with local fish wholesalers to obtain information on the commercial landings of Guam. It is from these two sources, DAWR and wholesalers, that the original data for the statistics presented in this report have come.

DATA COLLECTING SYSTEMS

The Guam data collecting systems are divided into two distinctly different systems, one for collecting commercial landings information and one for collecting total landings information through creel surveys.

Commercial Landings

Fish entering the commercial market in Guam come from three sources, full-time commercial fishermen, part-time commercial fishermen, and subsistence or recreational fishermen who frequently sell portions of their catch. No licenses are required to sell fish in Guam, nor are there any reporting

requirements for those selling fish. Before 1979, there was no central place to sell fish, so fishermen had to develop their own markets and peddle their own fish after each trip. The Guam Fishermen's Coop was established, via some government funding, in Agana in July 1979. The Coop subsequently became the central distribution center for fresh local fish. In 1982, WPACFIN began working with the Coop to improve their invoicing system and obtain data on all fish purchases. A cooperative system was established whereby the Coop would use the forms and coding schemes designed by WPACFIN and would supply copies of all invoices to WPACFIN for entering into computer format. In return, WPACFIN would provide the Coop with document quality control and computer generated summary statistics. All purchase data back to July 1979 also were coded and computerized.

Data from two other fish wholesalers were collected beginning in 1983 and continued until early 1987 by which time both had left the business. During 1987, a foreign tuna longline fleet began transshipping fish out of Guam. Excess fish from these boats became available to local buyers and the Coop's business suffered. Because of these and other marketing problems in 1987 and 1988 the recorded commercial purchases made by the Coop declined. Therefore our percent coverage of the total commercial landings declined, and the reported commercial data for 1988 do not reflect the true commercial fisheries as well as previous years. All tables and figures of commercial landings information included in this report are provided with the consent of the Coop wholesalers.

Data collected on commercial forms include

- Date
- Fisherman code
- Number of fishermen
- Hours fished
- Area fished
- Species caught
- Number of pieces caught
- Pounds caught
- Price per pound

Creel Surveys

The DAWR has the responsibility to monitor and protect the wildlife and marine resources of Guam. To this end, it began conducting creel surveys in the early 1970's. By systematic, random interviewing of fishermen, DAWR developed a means of estimating total catch and effort by fishing method for the inshore and offshore fisheries. Sampling methodologies were frequently modified in the early years to incorporate new information and insights gained during the surveys. Aerial surveys were conducted for several years to help improve estimates of percent coverage. The basic survey methodology was fairly well established by 1979. All data processing was done by

hand.

In the 1970's, an annual fishing derby was organized on Guam by groups of local fishermen. This 3-day tournament soon became a highly successful event, with much participation by local recreational and commercial fishermen. The DAWR began collecting census information on the Annual Guam International Fishing Derby activities as a means of obtaining additional catch and effort information. Although the significance of these data is minor compared to the creel surveys, summaries of derby results are included in this document as a point of interest.

In 1982, WPACFIN hired a contractor to work with DAWR staff to improve the statistical validity of the creel surveys and to establish mathematical algorithms to expand the sample data to estimate total catch and effort with confidence intervals. Consequently, DAWR further improved its sampling methodologies based on the contractor's recommendations, such as adding surveys to better estimate total participation. The WPACFIN developed computer processing systems to automate the data handling and expansion activities. The system design is flexible enough to allow for continued improvements as additional information, insight, and funding are gained. It is essential for the user to understand the basic sampling design and some of the assumptions made for the offshore and inshore surveys to facilitate proper interpretation of the resultant statistics.

The DAWR's fishermen interviews, also called creel surveys, are divided into two separate, major surveys, offshore and inshore. Both are based on a systematic, random sampling of the fisheries; field sampling and interviews are done on a specific number of randomly selected weekdays and weekend-holidays each month. Both surveys are stratified by weekday and weekend-holiday sampling and, begining in 1988, were conducted on 4 days per month. Both include two subsurveys, one for counting and estimating total participation and one for actually interviewing fishermen for catch and effort information. Both are based on the assumptions that the information given by the fishermen is accurate and the fishermen interviewed are representative of the entire fishing population.

Offshore Creel

Most offshore fishing trips originate from one of three harbors on Guam. Apra Harbor is the largest of these harbors, serves military and commercial shipping activities, and is considered one of the best natural harbors in the western Pacific. It ranks third among the harbors as points of origination for offshore fishing trips. Cocos Lagoon on Guam's southern tip is the second largest protected harbor and ranks second as a launching area for offshore fishing trips. The Agana Boat Basin, centrally located on the west coast of Guam in the capitol of Agana, is the smallest of the three harbors but is the busiest launching area for offshore fishing trips. Therefore,

DAWR selected the boat basin as the site for interviewing offshore fishermen.

Concurrent with interviewing fishermen returning from trips at the boat basin, a participation survey is conducted to obtain counts of boating activity for the entire island. For estimating total participation for a survey day, unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. A further assumption is made that the fishing activity and success rate of fishermen originating at the Agana Boat Basin are not statistically different from those of fishermen leaving from other areas on the island. The basic premise of the offshore sampling program is that the combined interviews collected on each survey day are sufficient to estimate the average catch and effort for each fishing method used during that day. Therefore, each survey day represents a measurement of the offshore fisheries. Data collected during the participation portion of the offshore creel survey are limited to boat count by launching area, whereas data collected during interviews include the following:

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
  Area fished
  Boat number
* Number of fishermen
* Number of gear units
* Hours fished per gear
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
  Type total number of species
\# Total count for each species
  Type count for each species
\# Total weight for each species
  Type total weight for each species
\# Species name (or species group)
  Length for an individual fish
  Type individual length
  Weight for an individual fish
  Type individual weight
  Bait used (up to three different types)
  Wind direction and speed
  Weather conditions
  Cloud cover
  Lunar day
  Percent of catch kept
  Percent of catch sold to the Coop
  Percent of catch sold elsewhere

It is not always possible for the interviewer to obtain information on all items listed. However, those marked with an asterisk (*) are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign (#) are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

Inshore Creel Survey

Fielding the inshore creel survey is considerably more complex and troublesome than the offshore survey for several reasons. For instance, fishing activities originate from and occur over a large portion of the coastline, making participation counts and fishermen interviews much more difficult to obtain. Additionally, it is more difficult to obtain interviews for completed fishing trips because the interviewer must survey many miles of coastline where fishermen may quickly terminate their activities at any time. The turnover rate of fishermen during the sampling period is a difficult factor for which to adjust. Tidal stage and moon phase also influence inshore fishing much more than offshore fishing. Nighttime and seasonal pulse fishing are also major considerations for the inshore fisheries. In October 1984, DAWR began additional survey efforts to help quantify the nighttime and seasonal inshore fisheries.

Notwithstanding these complexities and problems, the basic designs of the offshore and inshore surveys are very similar in that they both have participation counts and creel interviews. Two of the significant differences between the offshore and inshore surveys are that the inshore participation counts are made by fishing method as well as by location, and that interview information is combined to form averages of catch and effort for a much larger time period (month, quarter, year) than a single day as in the offshore survey. Therefore, daily measurements of the inshore fisheries are based on island-wide participation counts for a survey day by using averages for the catch information based on user-specified, flexible time periods, typically quarterly and annual averages. This modification of the expansion algorithm was required for DAWR to physically complete an inshore survey with limited manpower. Participation counts for essentially the entire island can be obtained during a single sample day, but adequate creel interviews for all methods for the entire island cannot be obtained with the manpower available. Additionally, the surveyable portions of the coastline are divided into three regions to facilitate statistically sound sampling of fishermen. Data for the day and night surveys are processed and expanded separately. Data on the seasonal fisheries for juvenile rabbitfish and bigeye scad are collected at irregular intervals when the fisheries are active. Information collected during the inshore participation surveys includes

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Location fished
  Time sighted
* Method used
* Number of persons
* Number of gear units
  Reef zone fished
  Weather and water conditions
  Tidal stage

Information collected during the inshore interviews includes

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
* Location
  Reef zone fished
* Number of fishermen
* Number of gear units
* Actual hours fished per gear
* Estimated trip time
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
Total count for each species
  Type count for each species
Total weight for each species
  Type total weight for each species
Species name (or species group)
  Length for an individual fish
  Type individual length
  Weight for an individual fish
  Type individual weight
  Bait
  Wind direction
  Wind speed
  Weather conditions
  Cloud cover
  Surf
  Tidal stage
  Swell direction

As in the offshore survey, the interviewer cannot always obtain information on all items listed. Those marked with an asterisk are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

DATA PROCESSING SYSTEMS

The Guam data processing systems are divided into two separate and distinctly different systems, one for processing the commercial landings data and one for processing the DAWR creel survey data.

Commercial Landings

The processing system for the commercial landings data collected from the wholesalers is fairly straightforward. A purchase form is completed by the wholesaler each time fish are purchased from a fisherman. Catches are divided into categories for weighing by species or species group, and where practicable, number of pieces is recorded. Preferably, coding and initial quality control of the forms are done by Coop or DAWR personnel before they are shipped to WPACFIN for computer processing; however, these activities must sometimes be done by WPACFIN staff. Data are entered into a computer and loaded into central WPACFIN data bases, where edit reports are generated and used to locate and correct any errors in the data base. Once all edits, verifications, and corrections are made, summary reports are generated. Standard reports available include total monthly and annual landings by species, total landings by fisherman, and landings by fisherman by species. Purchase forms are returned to the wholesalers along with summary reports and graphs for their use.

Creel Surveys

The processing systems for the creel surveys are much more complex than those for the commercial landings data. The basic data handling and processing systems for the inshore and offshore surveys are the same. Data forms completed in the field during the participation and creel surveys are returned to the office and edited for completeness and legibility before the data are entered into structured computer data bases by using commercially available data base management software. Edit and summary reports are produced to verify the quality of the data, and any errors are corrected in the data bases. Data bases are then translated into standard record formats, which are readable by the data processing and expansion systems programmed by WPACFIN specifically for the offshore and inshore surveys. As data are converted into the Guam Offshore Expansion System (GOES) and the Guam Inshore Expansion System (GIES), additional error checks are performed by the computer to ensure only valid information enters the expansion systems. Errors are flagged and printed to facilitate correction. The GOES and GIES are menu- driven systems that step the user through a series of processes that summarize creel survey and participation data to produce catch and effort expansion and species composition files and reports. Although the GOES and GIES allow processing data for whatever

time increment the user specifies, typically 1 month of data is processed at a time for the offshore surveys, and 3-month or annual data are combined for the inshore surveys.

Generally speaking, the expansion algorithms for the offshore and inshore surveys are very similar. Estimates of total catch, effort, and participation for each fishing method are generated from information collected during the participation and creel surveys. The GOES uses same-day catch and effort averages to expand the participation counts, whereas the GIES uses user-specified, time period catch and effort averages to expand the daily participation counts. Inshore day and night surveys are treated identically but separately. The daily estimates are considered measurements of the fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan, and multiplied by proportionality constants to adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. All steps in the expansion process are stratified by fishing method. The expansion systems produce several detailed summary reports and a summary expansion data file containing the final totals for all important catch and effort statistics. This summary expansion file is later used to produce the types of reports contained in this document.

Estimates of species composition of the expanded catch are obtained for each method by multiplying the calculated percent species composition of the surveyed catch by the expanded total catch. Percent species composition by fishing method is obtained from the sampled catch based on the average individual weight and the total number of individuals recorded for that species. The average size of each species is obtained by one of three methods, depending on the availability of data in the data base. If total weight and count information are available, the average size per individual is calculated by dividing the total weight by the total count. If total weight and count information are not available but individual weight measurements for a species are available, the average size per individual is calculated by dividing the sum of all individual weights by the total number of individuals weighed. If neither of these methods can be used because no size information is available in the data base, the user is asked to input the species' average size, which is then multiplied by its total count to estimate total sampled catch of that species. Therefore, percent species composition is calculated by dividing the estimated sampled weight of the species by the estimated total sampled weight of all species combined. The species composition programs produce summary reports for immediate reference and summary data files for later use by reporting and summarizing software for generating the types of reports contained in this document.

Catch, effort, and participation data collected during the seasonal fisheries for bigeye scad and juvenile rabbitfish are processed by hand. Interview records are scarce, so hand tabulations and expansions are made to produce ballpark estimates of catch.

DATA REPORTING SYSTEMS

The Guam data reporting systems are divided into two separate systems, one for reporting on the commercial landings data and one for reporting the results of the creel survey.

Commercial Landings

After completing all editing and quality control activities for the commercial landings data, monthly and annual summary reports by species are generated. The commercial landings reports section of this document includes monthly and annual reports for 1990. Each table contains information on the pounds, value, average price per pound, and number of recorded landings for each species or species group. The number of recorded landings ("RECORDS" in the tables) is a measurement of how many times each species was purchased, regardless of its number or weight in the landing. This statistic is provided to give an indication of the frequency each species is reported. The POUNDS can be divided by the RECORDS to calculate the average weight of each landing. Each monthly report contains a subtotal for the sum of all species combined for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

Included with the commercial landings summary reports are graphs of some of the important statistics. The following groupings of species, species categories, and abbreviations are used in the tables and graphs for Guam's commercial landings:

I. Pelagic Management Unit Species (PMUS)

Mahimahi (dolphinfish)
Marlin (probably all blue but possibly striped or black)
Shortbill spearfish
Sailfish
Wahoo
Sharks

II. Bottom Fish Management Unit Species (BMUS)

Jacks (unclassified but excluding bigeye scad)
Bottom fish (unclassified)
Ehu (red snapper)
Gindai (flower snapper)

Grouper
Kalekale (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Opakapaka (pink snapper)
Uku (gray snapper)
Emperorfish

III. Billfish

Marlin (probably all blue but possibly striped or black)
Shortbill spearfish
Sailfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth or white tuna
Kawakawa

V. Other Tuna

All the above tunas excluding skipjack and yellowfin tunas.

VI. Fisheries Categories

A. Pelagic Species

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

Same as the BMUS

C. Reef Fish

Reef fish (unclassified)
Giant wrasse
Rabbitfish
Rudderfish
Squirrelfish
Parrotfish
Snapper
Surgeonfish
Unicornfish
Goatfish

D. Other

Miscellaneous (unclassified)
Bigeye scad
Mullet
Eels
Milkfish
Invertebrates (unclassified)
Crabs (unclassified)
Coconut crab
Lobster
Shrimp
Octopus
Squid
Seaweeds
Imported

Creel Surveys

Two general types of reports are included in this document from the DAWR creel surveys, catch and effort expansion reports and species composition reports. These reports are produced by using the expansion and species composition files created by the GOES and GIES as input to a series of utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from the GOES and GIES files to improve the presentation of the data and reduce the amount of space required to report the important statistics. Two of the most significant space saving improvements are the combining of many species into species groups, usually to the family level, and the combining of lesser used fishing methods into a single category. The original offshore and inshore species composition files contained about 300 different species categories, which were reduced to about 90 categories. For instance, 22 species of squirrelfish and 20 species of wrasse were reduced to just the 2 family groupings. All significant or important species retain their individual identity and are reported separately in the tables. In the original offshore species composition files, catches were reported for nine fishing methods; however, only two methods, trolling and bottom fishing, were significant as they generally accounted for over 97% of the catch. Therefore, reports of offshore species composition were reduced to just three method categories, trolling, bottom fishing, and other. Inshore species composition reports were reduced to totals only. Expansion reports for the inshore and offshore surveys include estimates of total catch and effort for each method recorded.

Monthly and annual catch and effort expansion reports and species composition reports are presented for the offshore fisheries for 1990. Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition

reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual reports will not equal those obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). This also makes expansion possible for months in which sampling was insufficient or nonexistent. The annual species composition reports were created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of percent species composition based on greatly increased sample size. Annual expansion and species composition reports are presented for the day and night inshore creel surveys for 1990. Combined day-night and offshore-inshore species composition reports are also presented.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort, in hours (boat hours for the offshore survey and gear hours for the inshore surveys). In the offshore expansion reports, the boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total boat count. A separate CV is included for each statistic reported in the offshore expansion reports, but because of the differences in the offshore and inshore expansion algorithms, only a single CV is included for all statistics reported in the inshore expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either the weekdays or the weekend- holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither day had sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the methods, the totals for the month are questionable.

In the offshore expansion reports, average monthly catch per unit of effort (CPUE) is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each offshore fishing method. The average monthly offshore CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation. However, for the inshore fisheries, which have a much lower number of creel interviews, the average monthly CPUE by fishing method is calculated by combining catch and effort information over a large timespan and, therefore, does not have an associated CV. Thus, the CPUE's for inshore fishing methods are calculated by dividing the sum of the catch by the sum of the gear-hours for whatever time period is included in the expansion.

Offshore species composition reports provide estimated landings and percent species composition for each species or species group for the two major offshore fishing methods, trolling and bottom fishing; a total for all other methods combined; and an overall total for all methods. The combined offshore-inshore and inshore species composition reports provide the statistics only for all methods combined.

The reports for the 1990 Annual Guam International Fishing Derby include derby and species totals by day for a variety of catch and effort statistics. Four major pelagic species are targeted during the derby, including billfish (primary blue marlin), yellowfin tuna, mahimahi, and wahoo. Other species such as skipjack tuna, rainbow runner, and barracuda are caught incidentally, but sometimes in substantial quantities.

INTERPRETATION OF STATISTICS

The user is reminded again to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all the fishing activities, but on samples of those activities. Commercial landings reports are believed to include a high percentage of the actual commercial landings made on Guam. The creel survey expansion reports are based on surveys of the offshore and inshore fisheries conducted 4 times per month. One

of the major factors in expanding the survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on Guam's fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen.

The creel survey reports in this section do not include estimates of catches made during the seasonal fisheries for bigeye scad,juvenile rabbitfish, and fusiliers. Therefore, the user must remember to adjust estimates of the total inshore and combined inshore-offshore fisheries. Based on a special sampling program designed to target these seasonal fisheries, the estimate for 1990 are 130,000, 4,000 and 2,000 pounds for bigeye scad, juvenile rabbitfish, and fusiliers respectively. The bigeye scad harvest was exceptionally high compared to previous years, but the juvenile rabbitfish did not run in as large of numbers as in 1988. Even though the number of fusiliers caught was not large, these numbers are above most years because these fish do not recruit in mass every year. The last year this fish appeared in any large quantity was in 1984.

Table IV.1.1

Guam 1990 Annual Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	298.00	752.40	2.52
Bigeye scad (atulai)	1,314.50	3,285.25	2.50
Jacks	2,358.00	5,337.75	2.26
Mullet	689.00	1,476.50	2.14
Sharks	45.00	112.50	2.50
Bottom fish	3,115.50	7,607.42	2.44
Ehu (red snapper)	579.00	1,806.75	3.12
Gindai (flower snap)	219.25	672.88	3.07
Grouper	1,591.00	3,483.25	2.19
Kalikali (pink snap)	340.00	963.38	2.83
Lehi (silverjaw)	332.25	1,013.25	3.05
Onaga (red snapper)	1,311.00	6,357.85	4.85
Opakapaka (pink snp)	426.25	1,364.37	3.20
Uku (gray snapper)	1,032.50	2,179.52	2.11
Amberjack	8.50	17.00	2.00
Reef fish	4,068.00	9,882.29	2.43
Wrasse	9.00	17.38	1.93
Rabbitfish (hitting)	439.50	1,253.50	2.85
Rabbitfish (sesjun)	314.00	942.00	3.00
Rudderfish (guilli)	56.50	141.25	2.50
Emperor (mafute)	2,479.00	5,933.87	2.39
Squirrelfish	465.50	1,384.25	2.97
Parrotfish	1,427.50	3,774.50	2.64
Snapper	394.50	1,121.75	2.84
Surgeonfish	301.00	902.00	3.00
Unicornfish	838.00	2,412.00	2.88
Goatfish	775.50	2,295.25	2.96
Troll fish	39.50	73.50	1.86
Barracuda	1,725.00	3,417.48	1.98
Dolphin (mahimahi)	53,231.95	107,233.13	2.01
Marlin	48,751.45	47,838.09	0.98
Spearfish	84.00	111.50	1.33
Sailfish	1,830.30	2,313.19	1.26
Rainbow runner	1,793.00	3,670.66	2.05
Wahoo	35,507.50	79,759.75	2.25
Tunas	16.50	37.13	2.25
Skipjack tuna	35,657.50	39,255.53	1.10
Dogtooth tuna	3,200.50	6,660.70	2.08
Yellowfin tuna	27,220.70	62,663.83	2.30
Kawakawa	237.50	284.13	1.20
Crabs (misc)	10.00	50.00	5.00
Lobster	221.75	956.25	4.31
Octopus	150.50	518.75	3.45
Imported	43,122.99	113,205.69	2.63
** TOTAL **	278,028.39	534,539.42	1.92

Table IV.1.2

Guam January 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	68.00	136.00	2.00
Jacks	119.00	238.00	2.00
Bottom fish	158.50	397.88	2.51
Gindai (flower snap)	3.00	9.00	3.00
Grouper	22.00	66.00	3.00
Lehi (silverjaw)	0.75	1.88	2.51
Uku (gray snapper)	13.00	26.00	2.00
Reef fish	54.50	132.35	2.43
Rabbitfish (hitting)	22.00	66.00	3.00
Rabbitfish (sesjun)	18.00	54.00	3.00
Emperor (mafute)	18.00	50.00	2.78
Squirrelfish	30.00	90.00	3.00
Parrotfish	18.00	54.00	3.00
Snapper	26.00	78.00	3.00
Surgeonfish	27.00	81.00	3.00
Unicornfish	41.00	123.00	3.00
Goatfish	43.00	129.00	3.00
Barracuda	143.00	275.27	1.92
Dolphin (mahimahi)	4,127.00	8,965.89	2.17
Marlin	723.50	841.88	1.16
Rainbow runner	7.50	15.00	2.00
Wahoo	2,542.00	5,689.93	2.24
Skipjack tuna	770.50	965.63	1.25
Dogtooth tuna	403.00	912.06	2.26
Yellowfin tuna	569.00	1,347.51	2.37
Kawakawa	40.50	48.50	1.20
Lobster	3.00	15.00	5.00
Octopus	2.00	7.00	3.50
Imported	208.00	624.00	3.00
** SUBTOTAL **	10,220.75	21,439.78	2.10

Table IV.1.3

Guam February 1990 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	7.00	14.00	2.00
Grouper	71.00	213.00	3.00
Reef fish	233.00	585.63	2.51
Rabbitfish (hitting)	212.00	636.00	3.00
Rabbitfish (sesjun)	201.00	603.00	3.00
Squirrelfish	217.00	651.00	3.00
Parrotfish	369.00	1,107.00	3.00
Snapper	149.00	447.00	3.00
Surgeonfish	170.00	510.00	3.00
Unicornfish	278.00	834.00	3.00
Goatfish	406.00	1,218.00	3.00
Barracuda	100.50	196.63	1.96
Dolphin (mahimahi)	13,081.25	26,299.47	2.01
Marlin	2,294.00	2,975.13	1.30
Sailfish	69.00	114.50	1.66
Rainbow runner	57.00	118.88	2.09
Wahoo	2,847.00	6,527.60	2.29
Skipjack tuna	1,783.00	2,444.04	1.37
Dogtooth tuna	53.50	104.88	1.96
Yellowfin tuna	2,890.50	6,959.52	2.41
Lobster	59.75	298.75	5.00
Octopus	81.50	277.25	3.40
Imported	1,813.00	5,277.00	2.91
** SUBTOTAL **	27,443.00	58,412.28	2.13

Table IV.1.4

Guam March 1990 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	160.50	321.00	2.00
Mullet	109.50	261.00	2.38
Bottom fish	81.00	181.40	2.24
Ehu (red snapper)	4.00	12.00	3.00
Gindai (flower snap)	14.50	43.50	3.00
Grouper	126.00	378.00	3.00
Kalikali (pink snap)	3.50	10.50	3.00
Lehi (silverjaw)	35.50	106.50	3.00
Opakapaka (pink snp)	15.50	46.50	3.00
Uku (gray snapper)	7.50	15.00	2.00
Reef fish	56.50	153.25	2.71
Rabbitfish (hitting)	152.00	456.00	3.00
Rabbitfish (sesjun)	95.00	285.00	3.00
Emperor (mafute)	193.00	456.50	2.37
Squirrelfish	196.00	588.00	3.00
Parrotfish	379.50	1,136.00	2.99
Snapper	147.00	441.00	3.00
Surgeonfish	102.00	306.00	3.00
Unicornfish	315.00	945.00	3.00
Goatfish	294.00	882.00	3.00
Barracuda	172.50	335.50	1.94
Dolphin (mahimahi)	12,489.75	25,441.86	2.04
Marlin	588.00	799.62	1.36
Spearfish	18.00	27.00	1.50
Sailfish	199.50	269.75	1.35
Rainbow runner	16.00	32.00	2.00
Wahoo	6,491.75	14,441.64	2.22
Skipjack tuna	2,847.50	3,988.13	1.40
Dogtooth tuna	237.50	442.88	1.86
Yellowfin tuna	3,272.30	7,681.66	2.35
Kawakawa	58.00	87.00	1.50
Lobster	51.00	255.00	5.00
Octopus	67.00	234.50	3.50
Imported	3,162.00	9,083.75	2.87
** SUBTOTAL **	32,158.30	70,144.44	2.18

Table IV.1.5

Guam April 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	62.50	130.00	2.08
Jacks	214.00	409.50	1.91
Mullet	63.50	127.00	2.00
Bottom fish	771.00	1,924.00	2.50
Ehu (red snapper)	42.50	127.50	3.00
Gindai (flower snap)	16.00	48.00	3.00
Grouper	5.50	16.50	3.00
Kalikali (pink snap)	18.00	54.00	3.00
Lehi (silverjaw)	47.50	142.50	3.00
Onaga (red snapper)	120.50	737.50	6.12
Opakapaka (pink snp)	72.00	216.00	3.00
Uku (gray snapper)	61.00	122.00	2.00
Reef fish	579.00	1,522.50	2.63
Wrasse	2.00	4.00	2.00
Emperor (mafute)	127.50	318.75	2.50
Snapper	23.50	39.00	1.66
Goatfish	2.00	5.00	2.50
Troll fish	15.50	31.00	2.00
Barracuda	353.00	732.87	2.08
Dolphin (mahimahi)	11,383.25	18,955.87	1.67
Marlin	1,155.50	1,434.00	1.24
Sailfish	43.50	65.25	1.50
Rainbow runner	40.50	81.00	2.00
Wahoo	3,884.00	8,043.32	2.07
Skipjack tuna	3,112.00	3,868.48	1.24
Dogtooth tuna	338.00	750.00	2.22
Yellowfin tuna	2,665.00	6,146.20	2.31
Imported	448.00	903.50	2.02
** SUBTOTAL **	25,666.25	46,955.24	1.83

Table IV.1.6

Guam May 1990 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	42.00	84.00	2.00
Mullet	15.00	30.00	2.00
Bottom fish	280.50	674.88	2.41
Ehu (red snapper)	89.50	280.25	3.13
Gindai (flower snap)	4.00	12.00	3.00
Grouper	338.00	652.75	1.93
Kalikali (pink snap)	3.50	10.50	3.00
Lehi (silverjaw)	31.00	93.00	3.00
Onaga (red snapper)	286.50	1,823.00	6.36
Opakapaka (pink snp)	45.50	146.25	3.21
Uku (gray snapper)	18.50	37.00	2.00
Reef fish	887.00	2,114.95	2.38
Rabbitfish (hitting)	51.00	89.25	1.75
Emperor (mafute)	127.00	270.12	2.13
Barracuda	235.00	461.50	1.96
Dolphin (mahimahi)	985.00	1,970.15	2.00
Marlin	5,849.40	6,466.05	1.11
Spearfish	29.00	29.00	1.00
Sailfish	775.50	954.15	1.23
Rainbow runner	261.00	358.75	1.37
Wahoo	2,210.40	5,153.61	2.33
Tunas	16.50	37.13	2.25
Skipjack tuna	3,227.00	3,303.01	1.02
Dogtooth tuna	350.00	741.75	2.12
Yellowfin tuna	2,827.90	6,525.83	2.31
Kawakawa	25.50	31.88	1.25
Imported	243.00	444.50	1.83
** SUBTOTAL **	19,254.20	32,795.26	1.70

Table IV.1.7

Guam June 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	28.50	71.25	2.50
Jacks	22.00	47.50	2.16
Mullet	200.00	400.00	2.00
Bottom fish	568.00	1,385.13	2.44
Ehu (red snapper)	167.00	542.75	3.25
Gindai (flower snap)	16.00	48.00	3.00
Grouper	554.50	883.25	1.59
Kalikali (pink snap)	39.00	117.00	3.00
Lehi (silverjaw)	40.50	121.50	3.00
Onaga (red snapper)	118.50	658.50	5.56
Opakapaka (pink snp)	81.50	244.50	3.00
Uku (gray snapper)	50.50	106.63	2.11
Reef fish	404.50	994.38	2.46
Emperor (mafute)	4.50	11.25	2.50
Squirrelfish	1.00	2.50	2.50
Snapper	15.00	33.75	2.25
Goatfish	30.00	60.00	2.00
Barracuda	79.00	157.50	1.99
Dolphin (mahimahi)	354.00	779.14	2.20
Marlin	8,173.00	6,752.13	0.83
Rainbow runner	398.00	809.88	2.03
Wahoo	643.25	1,461.34	2.27
Skipjack tuna	2,577.00	3,010.64	1.17
Dogtooth tuna	126.50	244.50	1.93
Yellowfin tuna	2,706.00	6,400.28	2.37
Kawakawa	52.00	52.00	1.00
Lobster	15.00	60.00	4.00
Imported	2,298.00	4,688.85	2.04
** SUBTOTAL **	19,762.75	30,144.15	1.53

Table IV.1.8

Guam July 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	3.50	7.00	2.00
Bigeye scad (atulai)	740.50	1,884.25	2.54
Jacks	250.50	570.75	2.28
Mullet	180.50	361.00	2.00
Bottom fish	199.50	483.00	2.42
Ehu (red snapper)	112.50	337.50	3.00
Gindai (flower snap)	50.75	152.25	3.00
Grouper	44.00	114.50	2.60
Kalikali (pink snap)	85.00	240.25	2.83
Lehi (silverjaw)	26.00	78.00	3.00
Onaga (red snapper)	103.50	503.50	4.86
Opakapaka (pink snp)	23.50	70.50	3.00
Uku (gray snapper)	104.00	208.00	2.00
Reef fish	825.00	1,944.50	2.36
Emperor (mafute)	517.50	1,216.75	2.35
Squirrelfish	15.50	37.75	2.44
Parrotfish	23.50	58.75	2.50
Snapper	4.00	8.00	2.00
Barracuda	103.25	196.51	1.90
Dolphin (mahimahi)	305.20	555.20	1.82
Marlin	10,576.15	9,033.36	0.85
Sailfish	263.00	285.99	1.09
Rainbow runner	46.50	97.39	2.09
Wahoo	682.10	1,604.20	2.35
Skipjack tuna	5,542.50	5,183.73	0.94
Dogtooth tuna	244.00	498.25	2.04
Yellowfin tuna	3,043.00	6,798.72	2.23
Kawakawa	22.00	24.00	1.09
Crabs (misc)	10.00	50.00	5.00
Lobster	93.00	327.50	3.52
Imported	5,303.50	8,833.53	1.67
** SUBTOTAL **	29,543.45	41,764.63	1.41

Table IV.1.9

Guam August 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	54.50	136.25	2.50
Jacks	190.50	404.38	2.12
Mullet	9.00	22.50	2.50
Bottom fish	175.50	396.38	2.26
Ehu (red snapper)	6.00	18.00	3.00
Gindai (flower snap)	22.50	55.88	2.48
Grouper	95.00	240.75	2.53
Kalikali (pink snap)	57.00	171.00	3.00
Onaga (red snapper)	451.50	1,286.35	2.85
Opakapaka (pink snp)	65.00	218.75	3.37
Uku (gray snapper)	225.00	436.26	1.94
Reef fish	148.50	364.38	2.45
Wrasse	1.50	3.75	2.50
Rabbitfish (hitting)	2.50	6.25	2.50
Rudderfish (guilli)	43.00	107.50	2.50
Emperor (mafute)	830.00	1,992.00	2.40
Parrotfish	69.50	173.75	2.50
Snapper	9.50	23.75	2.50
Surgeonfish	2.00	5.00	2.50
Unicornfish	7.00	17.50	2.50
Goatfish	0.50	1.25	2.50
Barracuda	105.75	192.57	1.82
Dolphin (mahimahi)	97.00	218.26	2.25
Marlin	7,196.50	6,579.78	0.91
Sailfish	158.00	158.00	1.00
Rainbow runner	183.50	340.76	1.86
Wahoo	1,220.00	2,850.52	2.34
Skipjack tuna	3,894.50	3,934.89	1.01
Dogtooth tuna	135.50	258.13	1.91
Yellowfin tuna	1,599.00	3,609.18	2.26
Kawakawa	18.00	18.00	1.00
Imported	7,535.16	26,950.23	3.58
** SUBTOTAL **	24,608.41	51,191.95	2.08

Table IV.1.10

Guam September 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	11.50	28.75	2.50
Bigeye scad (atulai)	82.00	205.00	2.50
Jacks	532.50	1,212.50	2.28
Mullet	15.50	32.25	2.08
Sharks	45.00	112.50	2.50
Bottom fish	344.50	832.00	2.42
Ehu (red snapper)	49.00	110.25	2.25
Gindai (flower snap)	3.50	10.50	3.00
Grouper	113.00	291.75	2.58
Kalikali (pink snap)	10.00	25.00	2.50
Lehi (silverjaw)	14.00	40.75	2.91
Onaga (red snapper)	32.00	158.00	4.94
Opakapaka (pink snp)	29.00	87.00	3.00
Uku (gray snapper)	143.00	303.75	2.12
Reef fish	408.50	1,039.00	2.54
Wrasse	5.50	9.63	1.75
Emperor (mafute)	53.50	123.50	2.31
Squirrelfish	6.00	15.00	2.50
Parrotfish	19.00	47.50	2.50
Snapper	1.50	3.75	2.50
Unicornfish	26.00	65.00	2.50
Troll fish	24.00	42.50	1.77
Barracuda	140.00	272.50	1.95
Dolphin (mahimahi)	358.00	869.74	2.43
Marlin	7,277.40	6,421.91	0.88
Sailfish	114.30	114.30	1.00
Rainbow runner	283.00	606.25	2.14
Wahoo	1,609.25	3,872.23	2.41
Skipjack tuna	5,360.50	5,120.24	0.96
Dogtooth tuna	256.00	545.50	2.13
Yellowfin tuna	2,731.00	5,846.89	2.14
Kawakawa	19.00	19.00	1.00
Imported	6,823.90	16,198.62	2.37
** SUBTOTAL **	26,940.85	44,683.06	1.66

Table IV.1.11

Guam October 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	166.00	450.40	2.71
Bigeye scad (atulai)	242.50	606.25	2.50
Jacks	262.00	636.12	2.43
Mullet	46.50	99.75	2.15
Bottom fish	319.50	809.25	2.53
Ehu (red snapper)	43.50	154.25	3.55
Gindai (flower snap)	35.50	109.00	3.07
Grouper	61.50	169.75	2.76
Kalikali (pink snap)	18.00	51.50	2.86
Lehi (silverjaw)	46.50	147.37	3.17
Onaga (red snapper)	122.00	732.00	6.00
Opakapaka (pink snp)	71.25	257.37	3.61
Uku (gray snapper)	372.00	830.51	2.23
Amberjack	8.50	17.00	2.00
Reef fish	376.50	787.55	2.09
Rudderfish (guilli)	10.00	25.00	2.50
Emperor (mafute)	348.50	846.25	2.43
Parrotfish	55.00	137.50	2.50
Unicornfish	4.00	10.00	2.50
Barracuda	127.00	269.63	2.12
Dolphin (mahimahi)	2,564.50	6,171.95	2.41
Marlin	3,549.50	4,632.98	1.31
Sailfish	120.50	209.00	1.73
Rainbow runner	144.00	326.37	2.27
Wahoo	2,765.75	6,755.92	2.44
Skipjack tuna	2,863.75	2,946.12	1.03
Dogtooth tuna	297.00	533.37	1.80
Yellowfin tuna	2,200.50	4,700.85	2.14
Imported	7,846.00	19,193.80	2.45
** SUBTOTAL **	25,087.75	52,616.81	2.10

Table IV.1.12

Guam November 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	140.00	350.00	2.50
Jacks	343.00	857.50	2.50
Mullet	15.00	45.00	3.00
Bottom fish	52.00	134.50	2.59
Ehu (red snapper)	20.50	69.00	3.37
Gindai (flower snap)	24.00	84.00	3.50
Grouper	129.50	364.00	2.81
Kalikali (pink snap)	57.00	161.13	2.83
Lehi (silverjaw)	64.50	193.50	3.00
Onaga (red snapper)	20.00	120.00	6.00
Uku (gray snapper)	27.00	67.50	2.50
Reef fish	1.50	5.25	3.50
Rudderfish (guilli)	3.50	8.75	2.50
Emperor (mafute)	62.50	156.25	2.50
Parrotfish	340.50	676.25	1.99
Snapper	5.50	13.75	2.50
Unicornfish	126.00	315.00	2.50
Barracuda	135.00	259.50	1.92
Dolphin (mahimahi)	3,363.50	7,138.80	2.12
Marlin	605.00	777.50	1.29
Rainbow runner	297.00	742.50	2.50
Wahoo	8,323.00	17,672.06	2.12
Skipjack tuna	2,703.50	3,040.75	1.12
Dogtooth tuna	232.50	446.37	1.92
Yellowfin tuna	1,293.00	3,010.56	2.33
Kawakawa	2.50	3.75	1.50
Imported	5,141.50	13,944.80	2.71
** SUBTOTAL **	23,528.50	50,657.97	2.15

Table IV.1.13

Guam December 1990 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	13.00	32.50	2.50
Jacks	215.00	542.50	2.52
Mullet	34.50	98.00	2.84
Bottom fish	165.50	389.00	2.35
Ehu (red snapper)	44.50	155.25	3.49
Gindai (flower snap)	29.50	100.75	3.42
Grouper	31.00	93.00	3.00
Kalikali (pink snap)	49.00	122.50	2.50
Lehi (silverjaw)	26.00	88.25	3.39
Onaga (red snapper)	56.50	339.00	6.00
Opakapaka (pink snp)	23.00	77.50	3.37
Uku (gray snapper)	11.00	26.87	2.44
Reef fish	93.50	238.55	2.55
Emperor (mafute)	197.00	492.50	2.50
Parrotfish	153.50	383.75	2.50
Snapper	13.50	33.75	2.50
Unicornfish	41.00	102.50	2.50
Barracuda	31.00	67.50	2.18
Dolphin (mahimahi)	4,123.50	9,866.80	2.39
Marlin	763.50	1,123.75	1.47
Spearfish	37.00	55.50	1.50
Sailfish	87.00	142.25	1.64
Rainbow runner	59.00	141.88	2.40
Wahoo	2,289.00	5,687.38	2.48
Skipjack tuna	975.75	1,449.87	1.49
Dogtooth tuna	527.00	1,183.01	2.24
Yellowfin tuna	1,423.50	3,636.63	2.55
Imported	2,300.93	7,063.11	3.07
** SUBTOTAL **	13,814.18	33,733.85	2.44
** TOTAL **	278,028.39	534,539.42	1.92

Figure IV.1.1

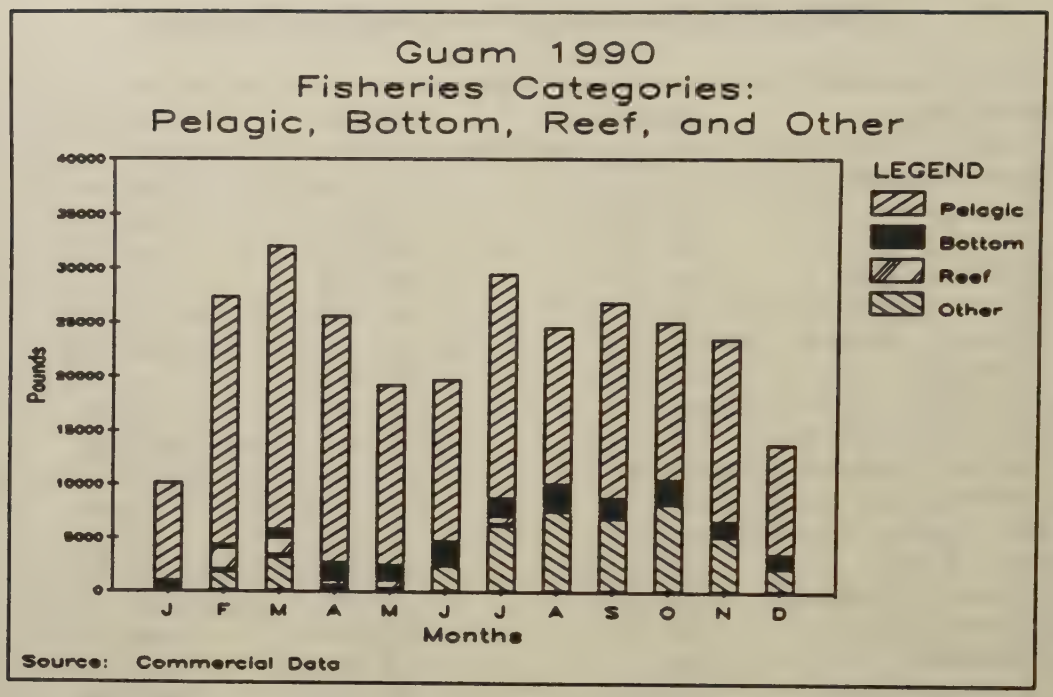


Figure IV.1.2

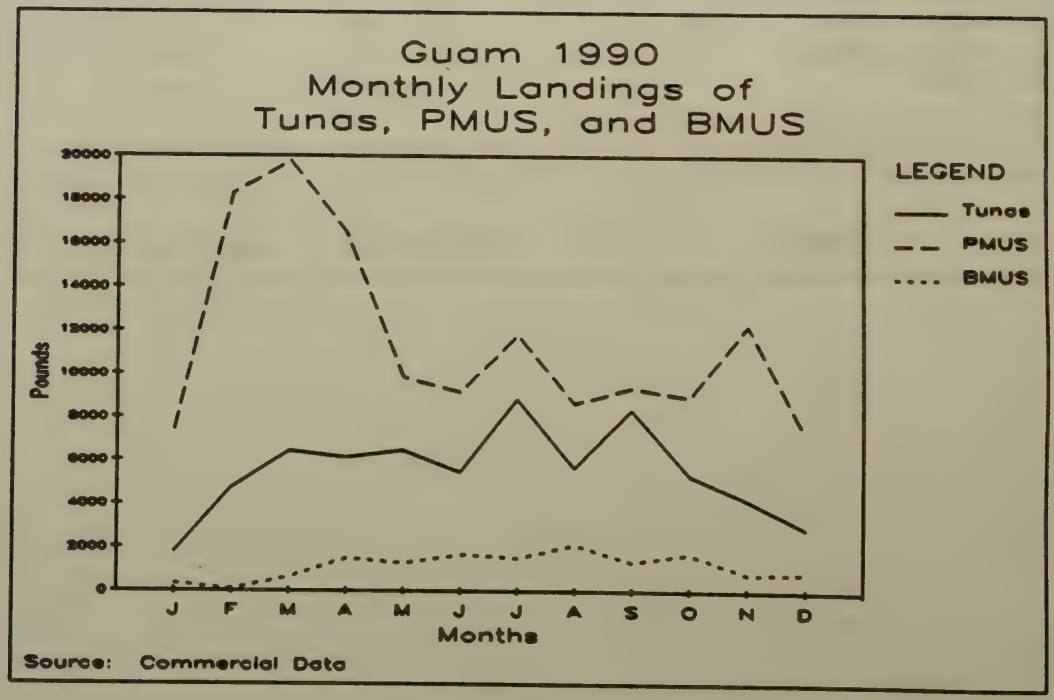


Figure IV.1.3

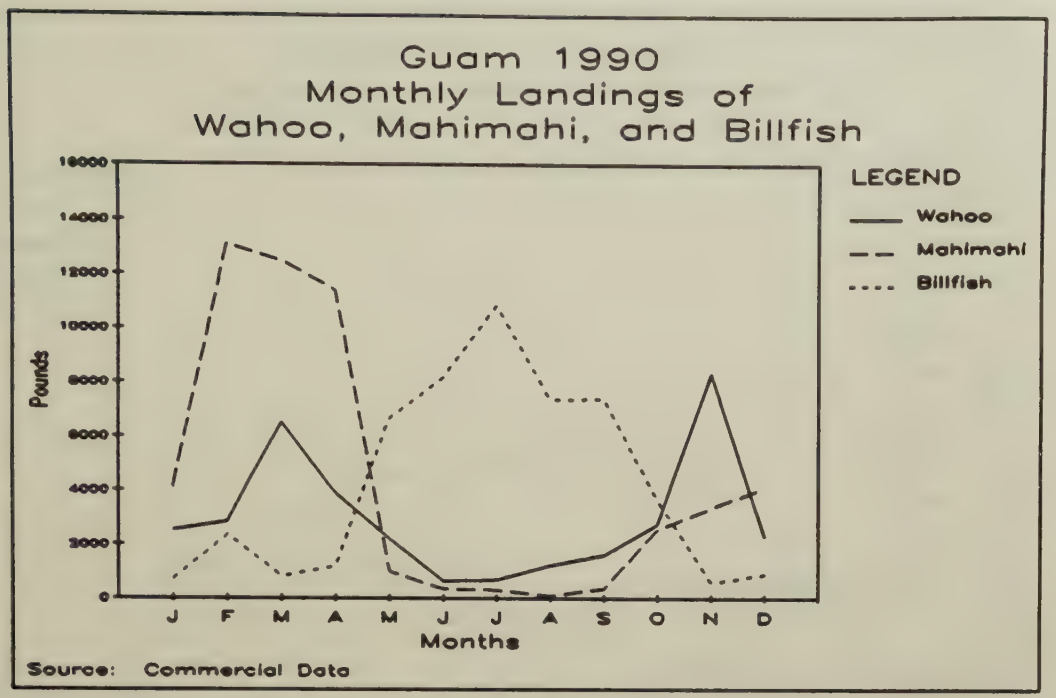


Figure IV.1.4

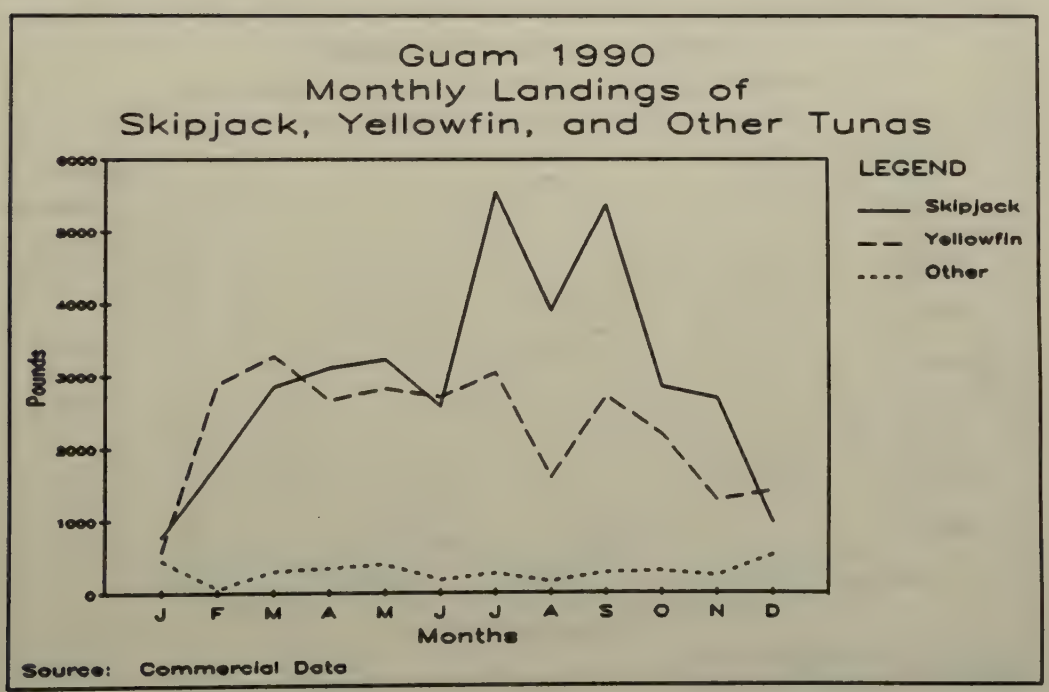


Figure IV.2.1

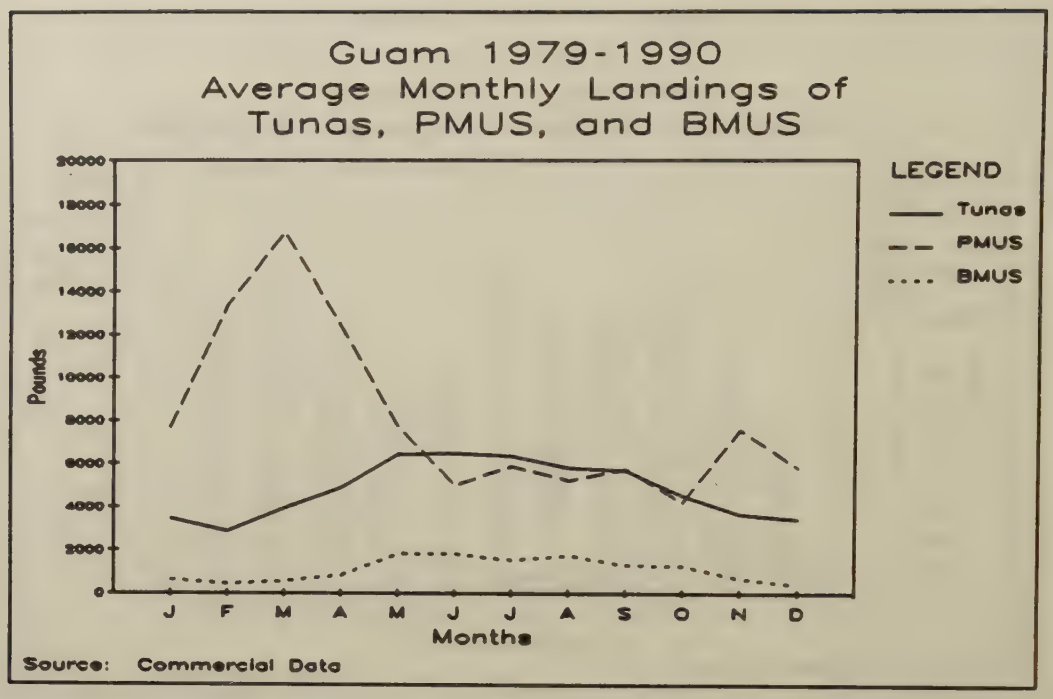


Figure IV.2.2

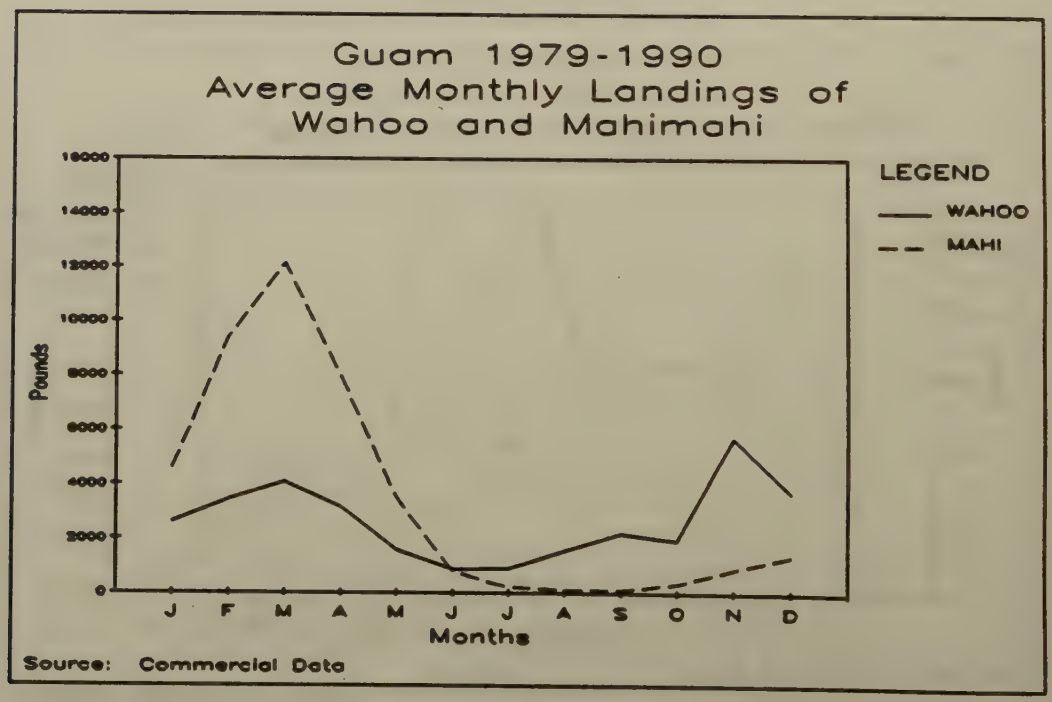


Figure IV.2.3

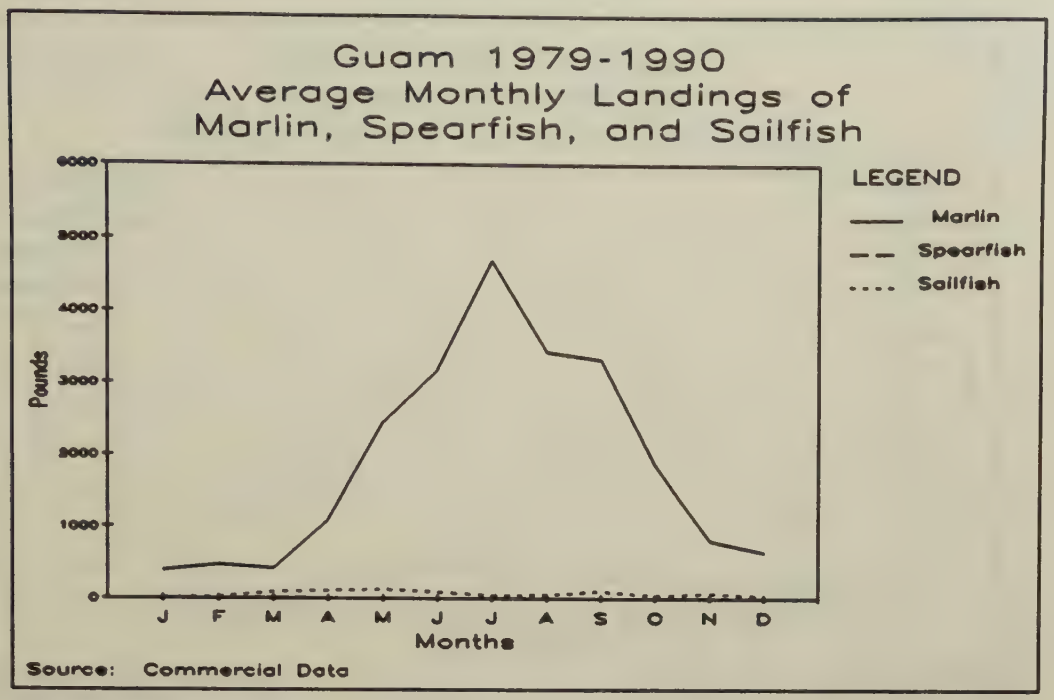


Figure IV.2.4

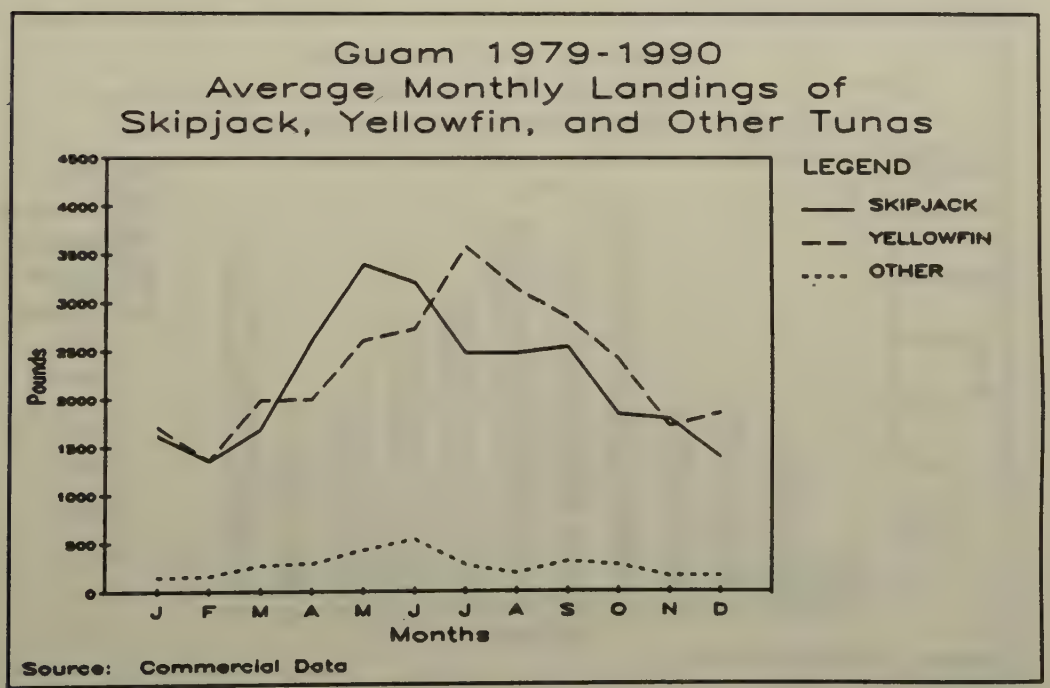


Figure IV.2.5

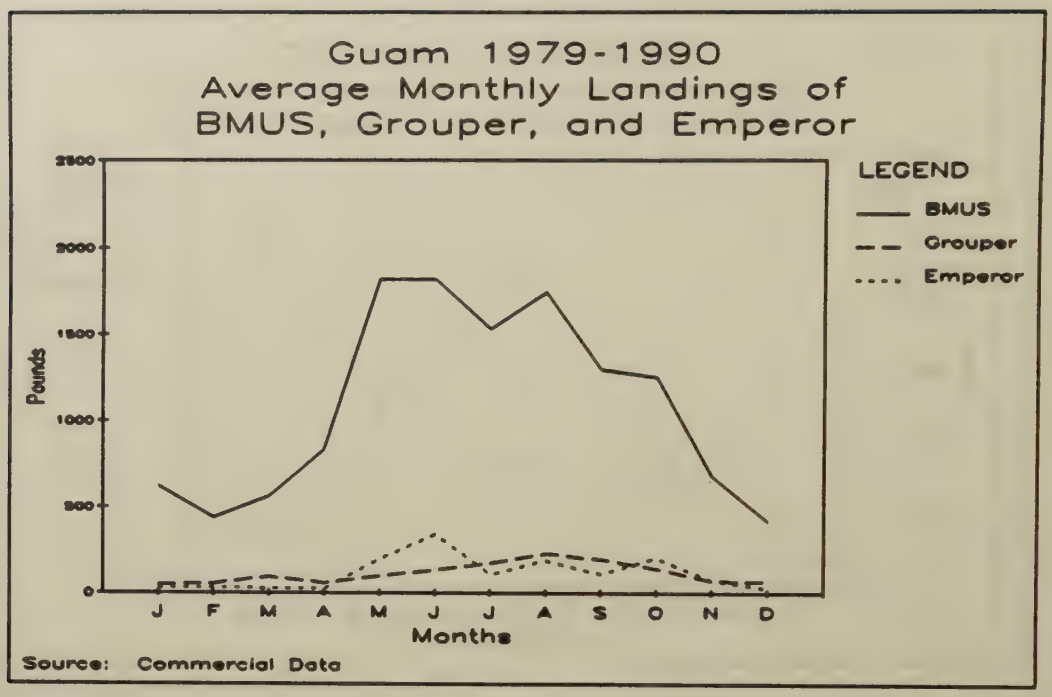


Figure IV.3.1

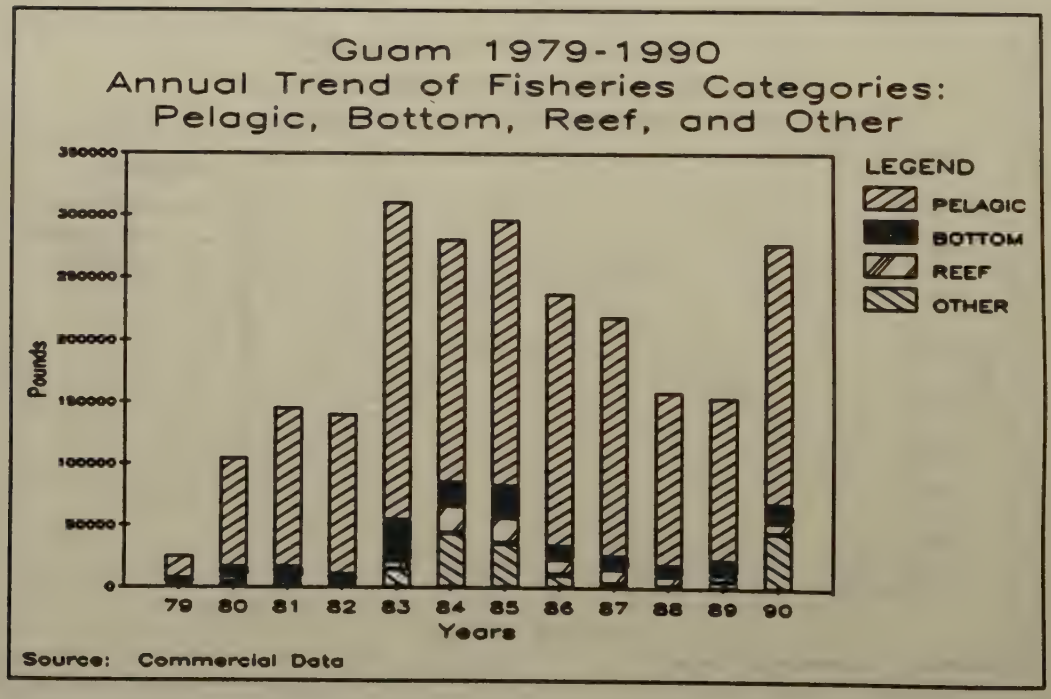


Figure IV.3.2

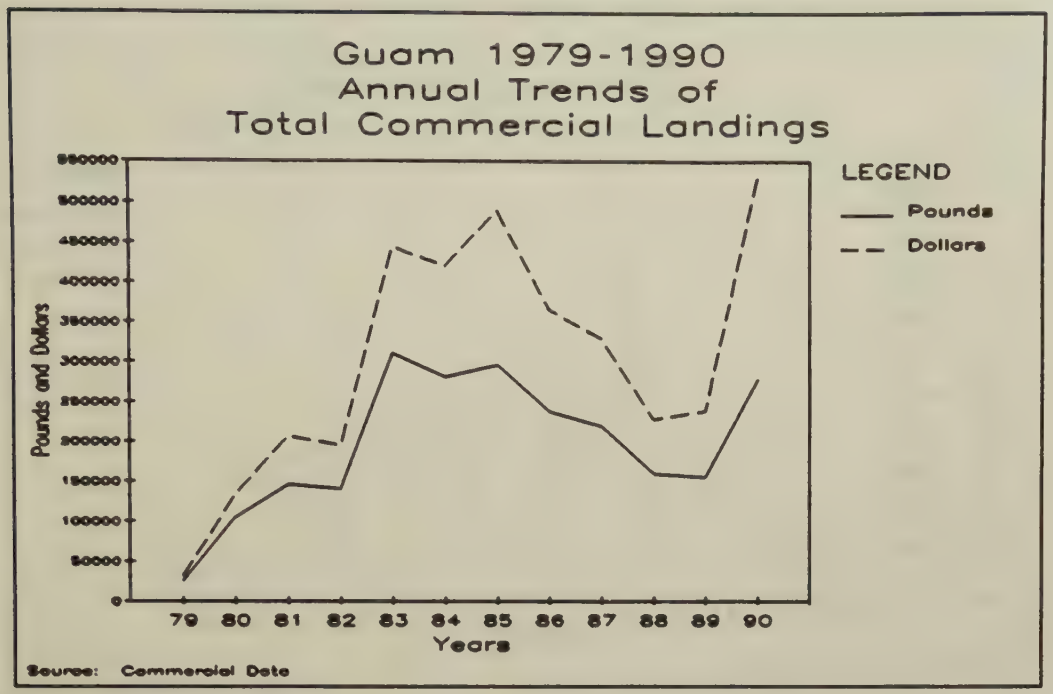


Figure IV.3.3

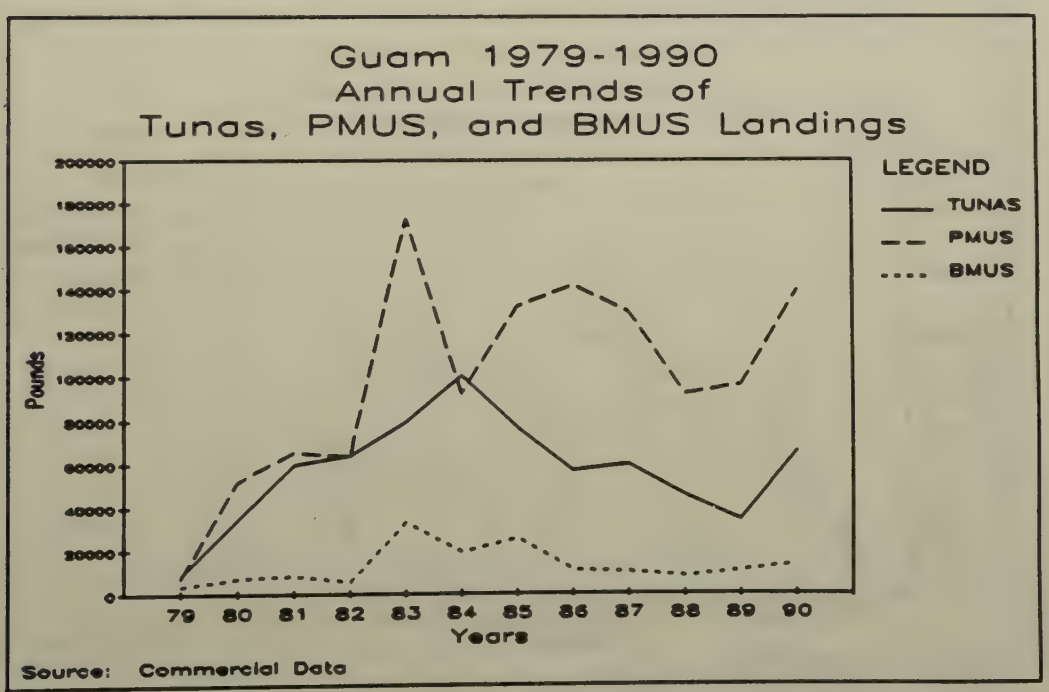


Figure IV.3.4

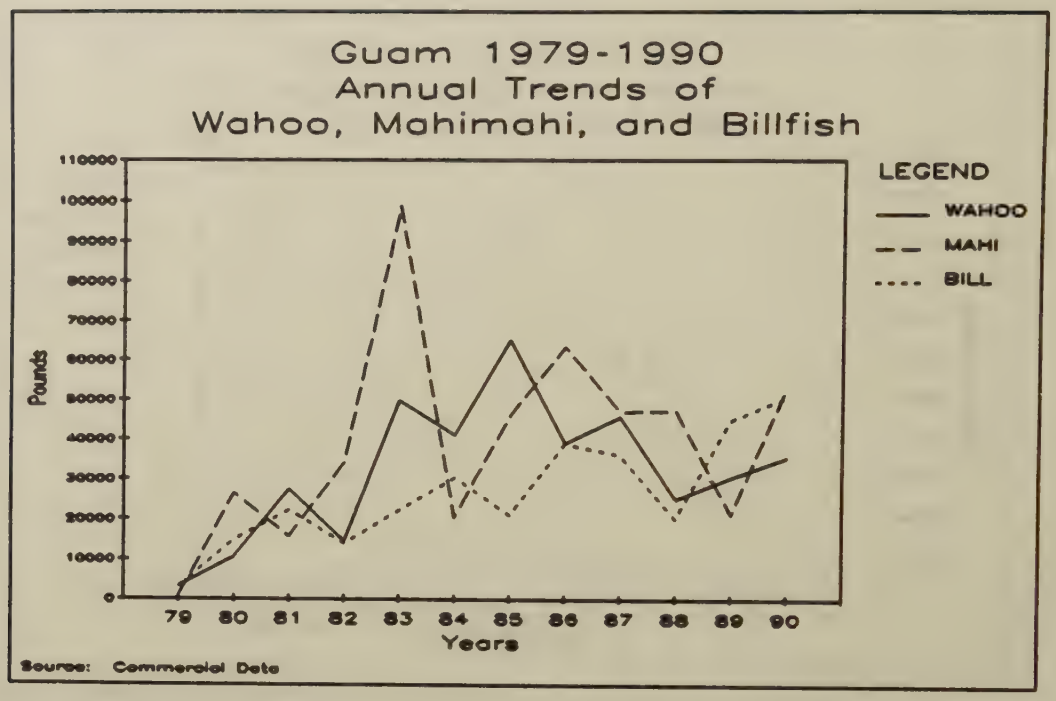


Figure IV.3.5

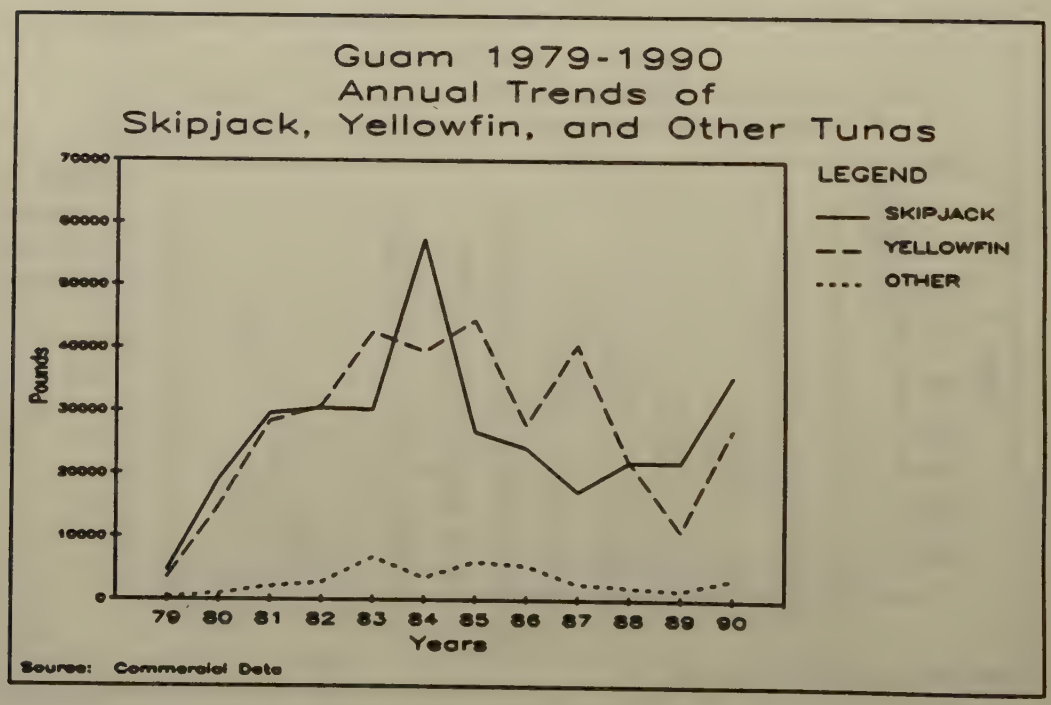


Figure IV.4.1

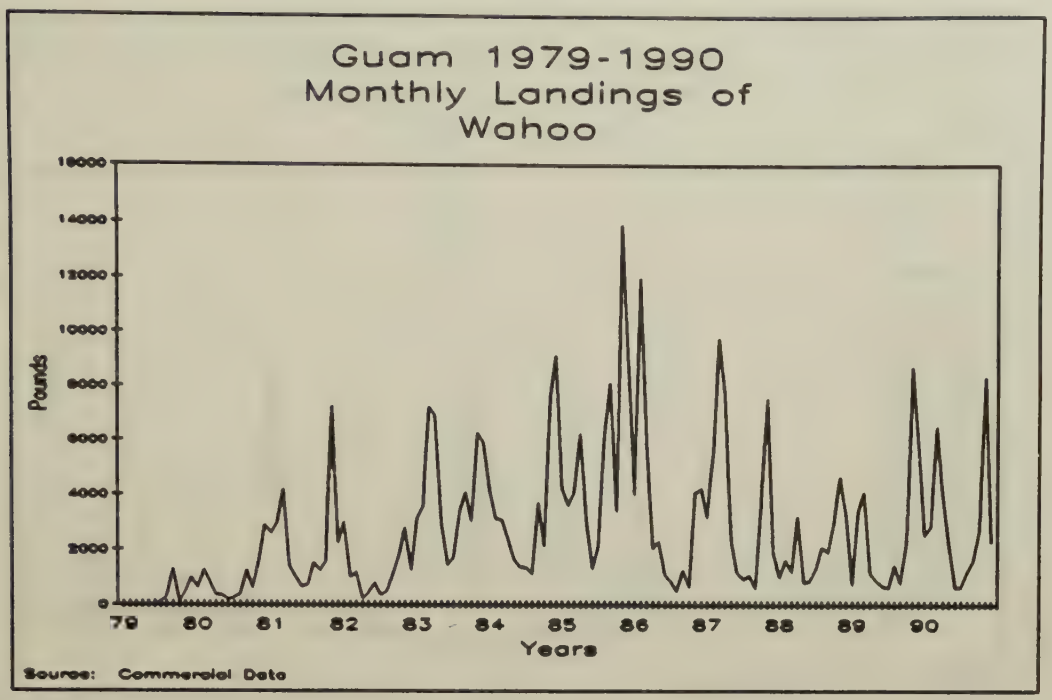


Figure IV.4.2

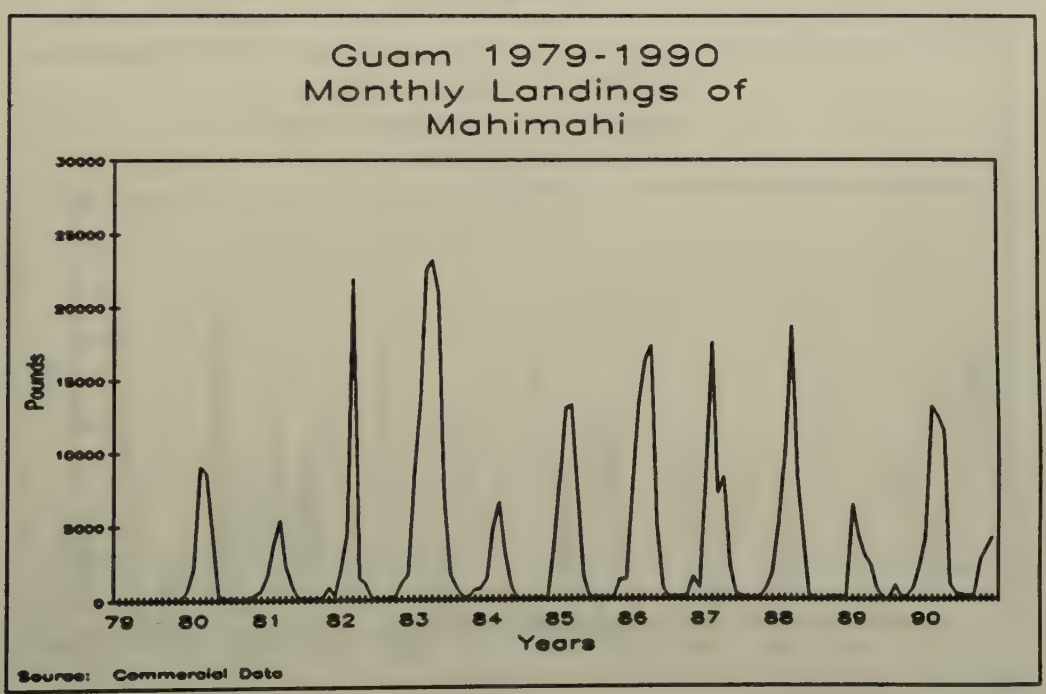


Figure IV.4.3

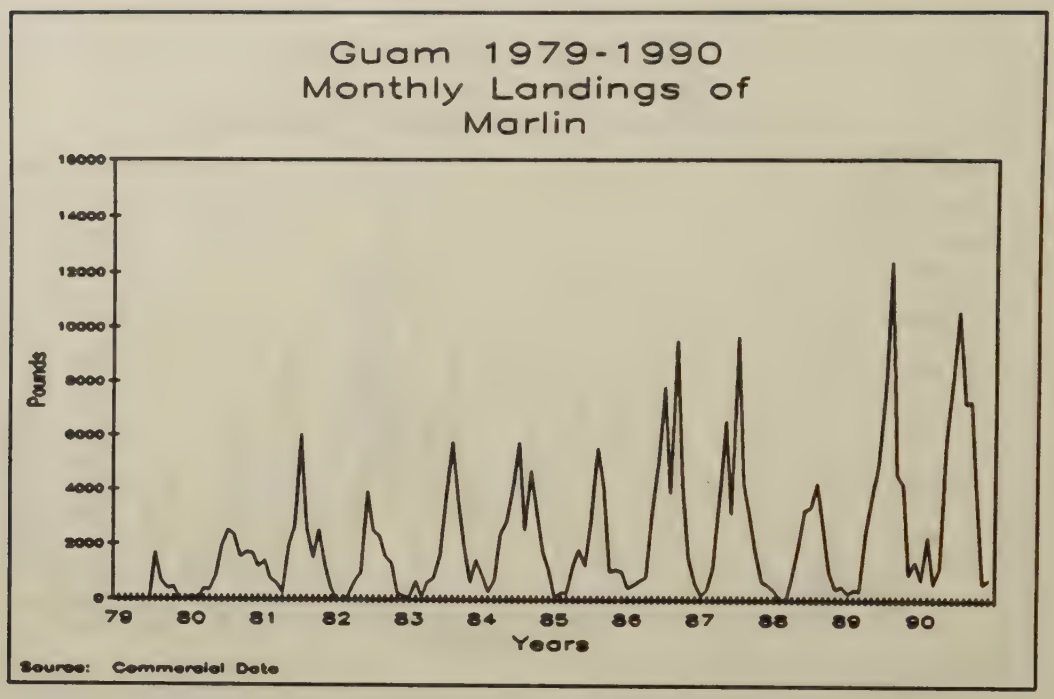


Figure IV.4.4

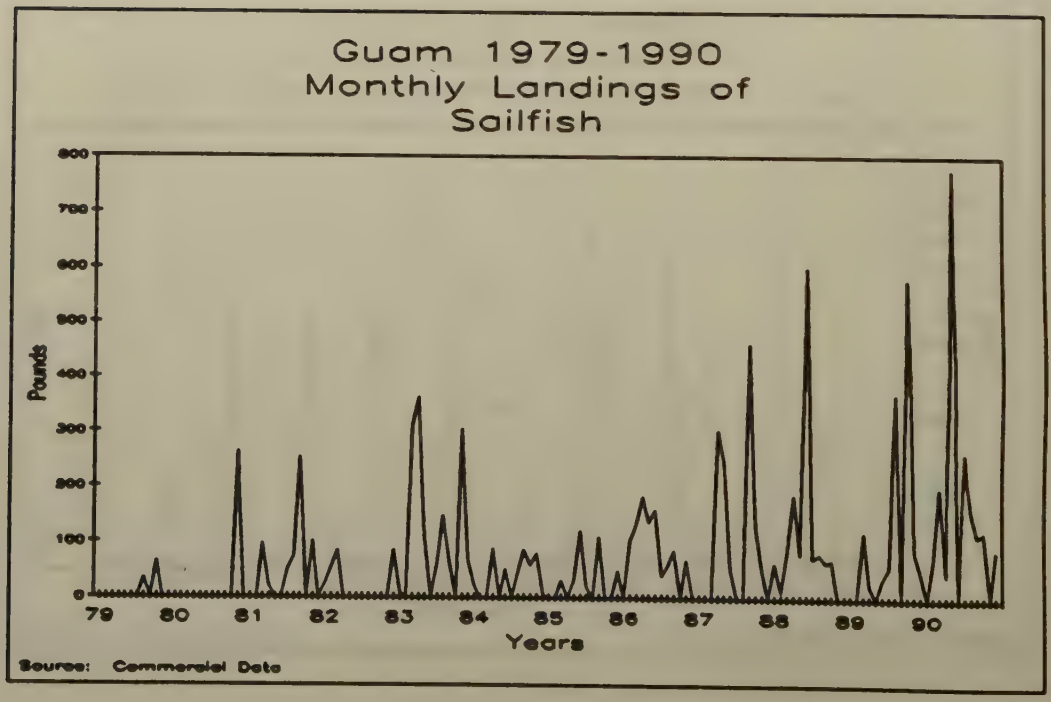


Figure IV.4.5

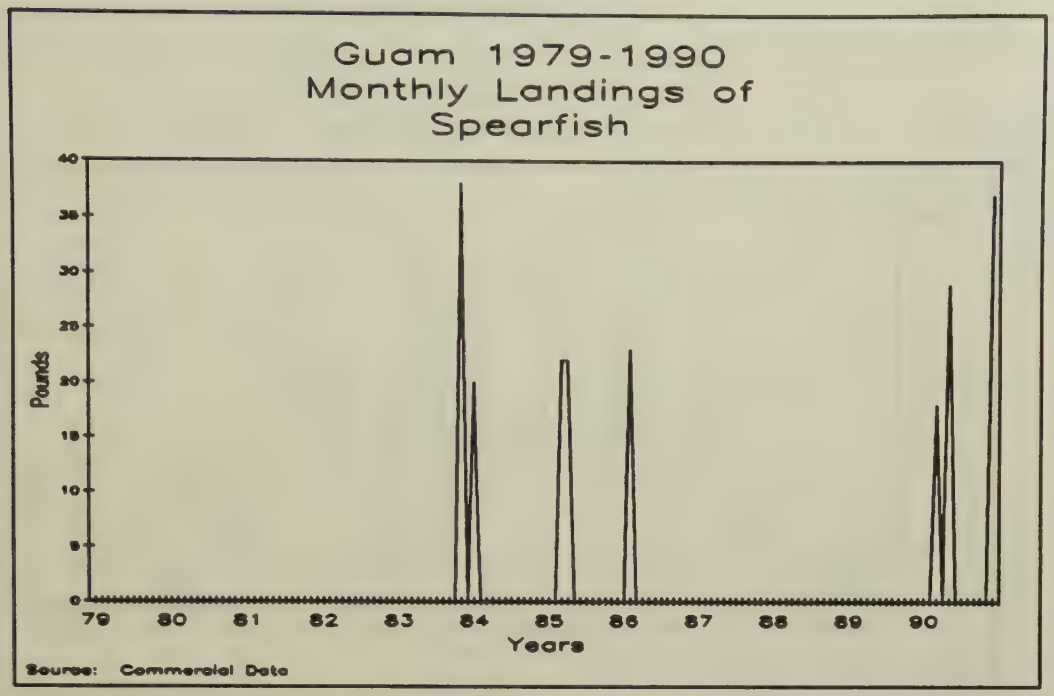


Figure IV.4.6

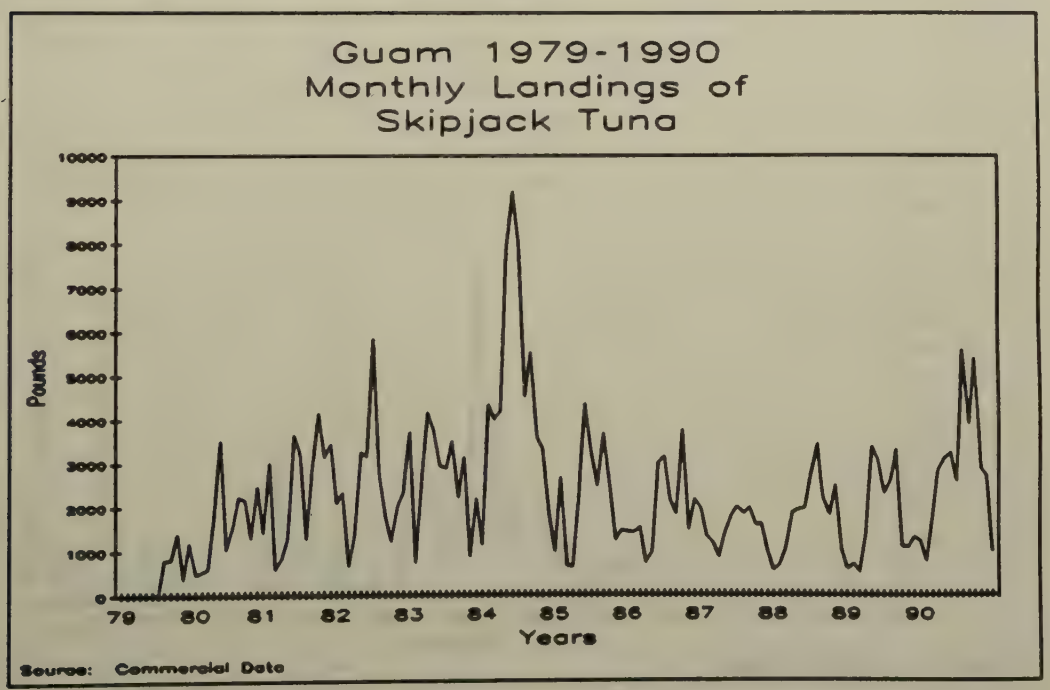
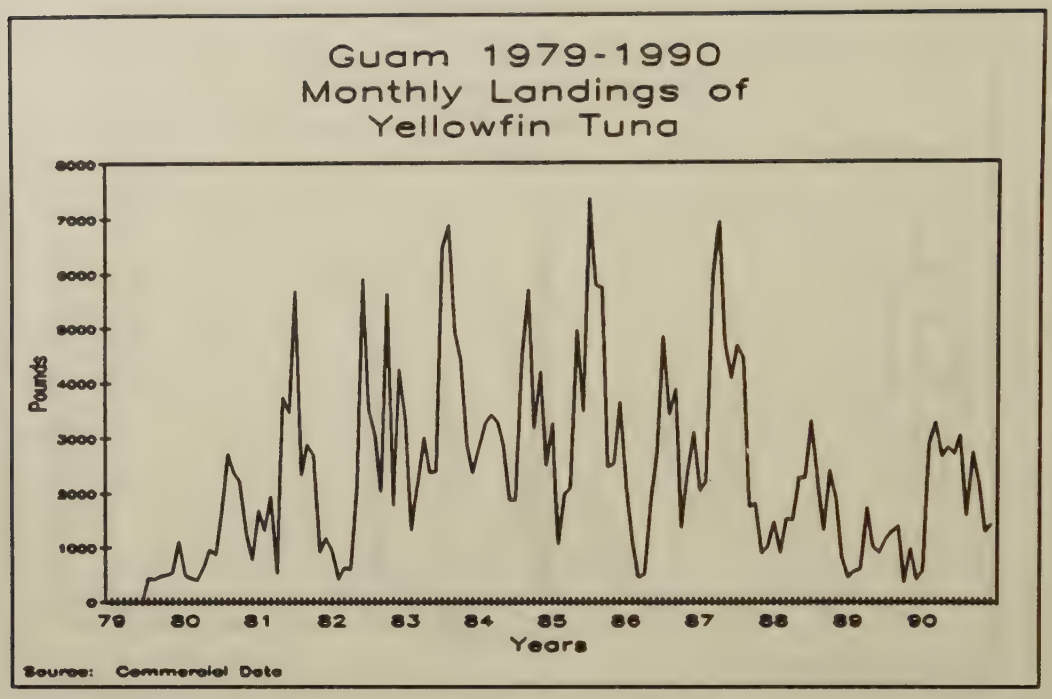


Figure IV.4.7



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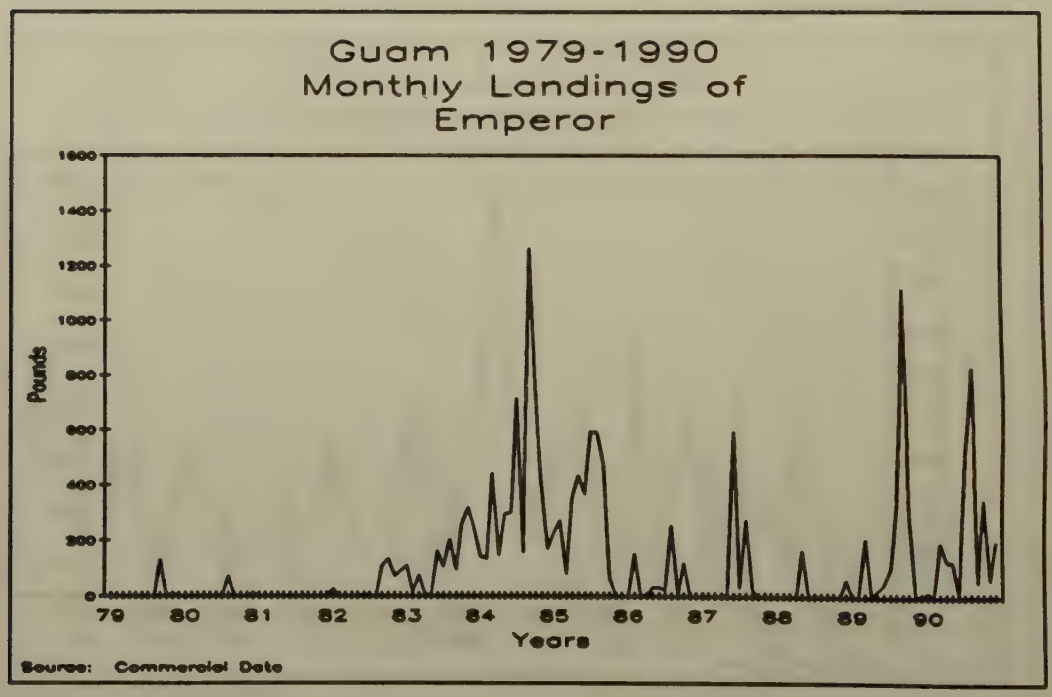


Figure IV.4.9

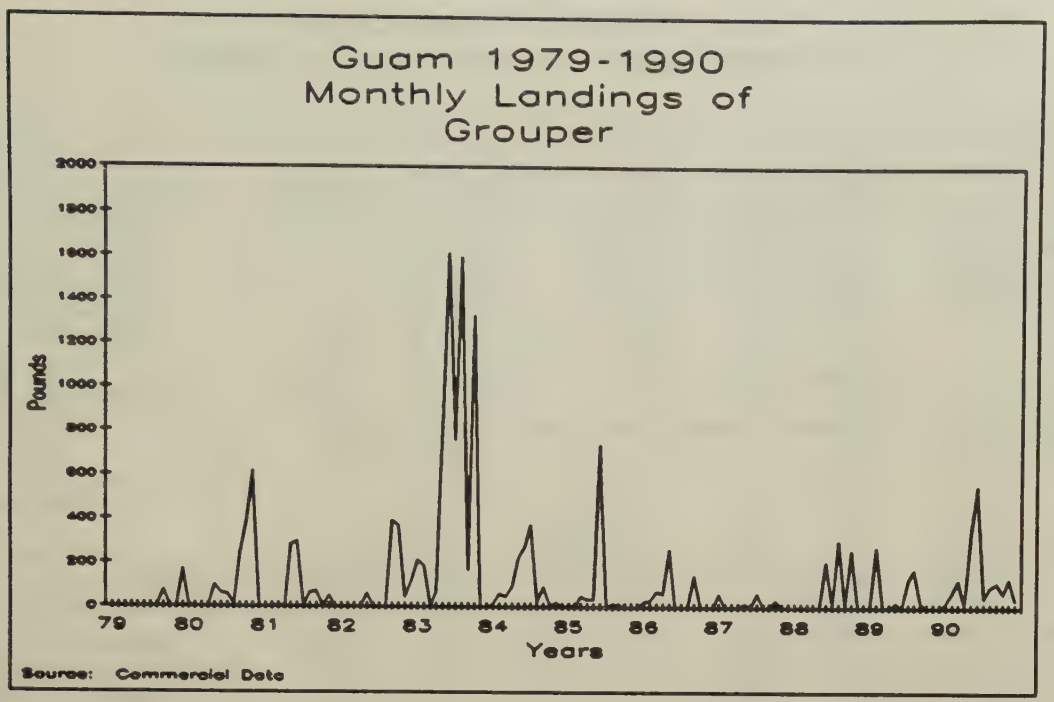

Guam 1979-1990
Monthly Landings of
Grouper
Pounds
2000
1800
1600
1400
1200
1000
800
600
400
200
0
79
80
81
82
83
84
85
86
87
88
89
90
Years
Source: Commercial Data

Table IV.2.1

Guam DAWR 1990 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	547266.2	11	54078.9	7	12295.9	5	234371.8	6	54139.3	5	9.8	7
BOTTOM FISH	44905.8	16	8533.5	14	2038.4	13	23822.2	15	5852.0	13	5.2	17
ATULAI JIG	7812.9	46	1394.9	28	333.6	30	3474.2	29	781.1	29	4.3	27
SPEAR MIX	482.7	65	29.3	79	29.3	79	104.8	71	104.8	71	28.7	0*
SPEAR SNORKEL	8883.9	58	818.1	42	321.7	30	3654.3	54	1276.1	40	9.8	24
SPEAR SCUBA	9338.2	36	276.7	28	193.8	26	885.4	29	608.6	26	50.9	68
OTHER	6116.7	38	696.5	38	172.5	36	2230.1	36	567.1	35	9.3	24
TOTAL:	624806.4	10	65828.0	7	13845.5	5	268542.8	6	58687.0	5	9.3	7

*Not enough data to properly compute Coefficient of Variation (CV).

Table IV.2.2

Guam DAWR Annual 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	2187.7	0.35	0	0	2187.7	4.87	0	0
Rays	103.0	0.02	0	0	0	0	103.0	0.32
Pike eels	11.7	0	0	0	11.7	0.03	0	0
Lizardfish	4.4	0	0	0	4.4	0.01	0	0
Flying fish	4.1	0	0	0	4.1	0.01	0	0
Needlefish	270.0	0.04	223.1	0.04	46.9	0.10	0	0
Lanterneyefish	158.3	0.03	0	0	158.3	0.35	0	0
Squirrelfish	1078.2	0.17	0	0	785.7	1.75	292.5	0.90
Cornetfish	4.6	0	0	0	0	0	4.6	0.01
Grouper	5494.5	0.88	0	0	4516.1	10.06	978.5	3.00
Bigeyes	158.6	0.03	0	0	105.3	0.23	53.4	0.16
Cardinalfish	6.2	0	0	0	6.2	0.01	0	0
False whiting	5.9	0	0	0	5.9	0.01	0	0
Jacks	4473.9	0.72	177.9	0.03	3238.5	7.21	1057.5	3.24
Rainbow runner	1240.3	0.20	1185.1	0.22	55.2	0.12	0	0
Bigeye scad (akule)	6252.2	1.00	4.8	0	4.0	0.01	6243.4	19.13
Dolphinfish (mahimahi)	126968.4	20.32	126854.2	23.18	114.2	0.25	0	0
Snappers	2675.7	0.43	353.6	0.06	1773.0	3.95	549.2	1.68
Lehi (silvermouth)	1435.2	0.23	0	0	1435.2	3.20	0	0
Uku (jobfish)	3871.7	0.62	0	0	3768.7	8.39	103.0	0.32
Ehu (pink snapper)	950.3	0.15	0	0	950.3	2.12	0	0
Onaga (red snapper)	1354.3	0.22	0	0	1354.3	3.02	0	0
Blue lined snapper	519.6	0.08	0	0	510.6	1.14	9.0	0.03
Yellowtail kalikali	2318.2	0.37	0	0	2318.2	5.16	0	0
Opakapaka (pink snap)	2477.4	0.40	0	0	2477.4	5.52	0	0
Yelloweye opakapaka	1131.8	0.18	0	0	1131.8	2.52	0	0
Kalikali (pink snapper)	55.1	0.01	0	0	55.1	0.12	0	0
Gindai (flower snapper)	2093.1	0.34	0	0	2093.1	4.66	0	0
Fusilier	13.3	0	0	0	0	0	13.3	0.04
Moharra	1418.2	0.23	0	0	0	0	1418.2	4.35
Sweetlips	53.7	0.01	0	0	0	0	53.7	0.16
Emperors	13149.8	2.10	0	0	11802.0	26.28	1347.8	4.13
Goatfish	1461.7	0.23	0	0	709.9	1.58	751.8	2.30
Sweepers	92.1	0.01	0	0	76.1	0.17	16.0	0.05
Rudderfish	430.5	0.07	0	0	0	0	430.5	1.32
Butterflyfish	10.9	0	0	0	0	0	10.9	0.03
Damselfishes	28.4	0	0	0	0	0	28.4	0.09
Hawkfish	2.1	0	0	0	2.1	0	0	0
Mullet	195.7	0.03	0	0	0	0	195.7	0.60
Barracuda	4805.5	0.77	3975.1	0.73	439.9	0.98	390.4	1.20
Wrasse	3278.8	0.52	0	0	879.9	1.96	2398.8	7.35
Parrotfish	4919.0	0.79	0	0	0	0	4919.0	15.07
Sand perch	2.6	0	0	0	2.6	0.01	0	0
Surgeonfish and tangs	5893.9	0.94	0	0	163.6	0.36	5730.3	17.56
Rabbitfish	396.1	0.06	0	0	0	0	396.1	1.21
Oilfish	29.3	0	0	0	29.3	0.07	0	0
Tunas	104.6	0.02	104.6	0.02	0	0	0	0
Wahoo	66106.6	10.58	66106.6	12.08	0	0	0	0
Kawakawa	6519.3	1.04	6519.3	1.19	0	0	0	0
Dogtooth tuna	2177.6	0.35	1928.0	0.35	114.7	0.26	134.9	0.41
Skipjack tuna	133459.8	21.36	133459.8	24.39	0	0	0	0
Yellowfin tuna	68075.7	10.89	68075.7	12.44	0	0	0	0
Sailfish	3795.6	0.61	3795.6	0.69	0	0	0	0
Blue marlin	134109.2	21.46	134109.2	24.51	0	0	0	0
Shortbill spearfish	393.9	0.06	393.9	0.07	0	0	0	0
Triggerfish	464.7	0.08	0	0	364.6	0.81	100.1	0.31
Filefish	27.2	0	0	0	0	0	27.2	0.08
Tripletooth puffers	73.3	0.01	0	0	73.3	0.16	0	0
Porcupinefish	90.9	0.01	0	0	0	0	90.9	0.28
Assorted bottom fish	1026.2	0.16	0	0	0	0	1026.2	3.14
Shallow bottom fish	1135.8	0.18	0	0	1135.8	2.53	0	0

Table IV.2.2 (cont.)

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Assorted reef fish	623.5	0.10	0	0	0	0	623.5	1.91
Mollusks	2492.5	0.40	0	0	0	0	2492.5	7.64
Octopus	146.9	0.02	0	0	0	0	146.9	0.45
Spiny lobsters	324.0	0.05	0	0	0	0	324.0	0.99
Slipper lobsters	61.2	0.01	0	0	0	0	61.2	0.19
Crabs	112.2	0.02	0	0	0	0	112.2	0.34
Total all species:	624806.4	100.00	547266.2	87.59	44905.8	7.19	32634.4	5.22

Table IV.3.1

Guam DAWR January 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	18521.6	27	2425.9	8	689.6	17	12237.5	8	3465.1	17	5.9	28
Bottom fish	117.0	89	123.8	66	69.4	74	487.8	65	261.2	71	1.1	0*
Spear snorkel	102.2	95	12.8	95	12.8	95	51.2	95	51.2	95	8.0	0*
Other	141.1	95	28.8	95	12.8	95	57.6	95	25.6	95	4.9	0*
Total:	18881.9	26	2591.3	3	742.0	15	12834.1	5	3608.8	16	6.2	22

Table IV.3.2

Guam DAWR February 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	55463.2	28	4969.7	12	1140.6	9	23091.7	9	5359.5	6	10.7	30
Bottom fish	1276.3	79	442.1	74	94.0	55	1076.8	56	263.2	22	2.4	30*
Spear snorkel	0	0	83.1	88	27.7	88	249.2	88	83.1	88	0	0*
Spear scuba	1193.2	46	45.5	23	38.6	7	105.2	31	87.5	16	24.3	44*
Total:	57932.7	27	5540.4	16	1212.8	13	24522.9	11	5515.0	9	10.4	31

Table IV.3.3

Guam DAWR March 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	79102.5	59	4188.3	47	910.0	32	14432.5	34	3342.2	18	14.0	36
Bottom fish	3123.0	73	419.0	76	96.6	74	1289.1	75	298.1	73	7.9	0*
Atulai jig	542.9	94	165.9	86	43.4	68	481.3	89	113.8	72	2.0	0*
Spear snorkel	221.2	95	70.1	83	42.6	35	135.7	89	71.8	59	1.7	141*
Spear scuba	1090.6	65	43.5	68	21.7	68	167.7	78	83.9	78	27.2	0*
Total:	84080.1	59	4886.8	49	1038.8	32	16506.3	38	3780.6	21	12.7	32

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.4

Guam DAWR April 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	60386.6	40	6458.5	35	1310.1	29	26087.7	30	5476.1	27	9.3	7
Bottom fish	3456.6	53	674.4	9	201.2	18	2158.3	19	659.0	27	3.6	117*
Atulai jig	751.9	72	208.6	67	37.4	65	513.3	80	91.2	79	3.3	19*
Spear scuba	1521.4	89	14.1	89	16.1	89	21.2	89	24.2	89	107.8	0*
Other	2617.3	17	161.1	54	33.8	47	687.7	22	150.4	13	22.6	66*
Total:	68733.8	36	7516.8	30	1384.6	26	29468.1	27	5672.1	25	9.1	4

Table IV.3.5

Guam DAWR May 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	41681.8	42	4526.3	28	1042.2	26	18957.4	23	4395.9	22	9.7	5
Bottom fish	6727.2	44	1499.9	23	330.1	12	4487.4	37	954.1	24	4.3	55
Atulai jig	235.7	88	91.5	88	22.9	88	183.0	88	45.7	88	2.6	0
Spear snorkel	191.9	88	68.7	88	22.9	88	343.6	88	114.5	88	2.8	0
Spear scuba	203.1	95	59.5	95	36.1	95	178.5	95	108.2	95	3.4	0
Other	0	0	36.1	95	18.0	95	180.3	95	90.2	95	0	0
Total:	49039.8	39	6281.9	22	1251.9	21	24330.2	23	4954.6	23	7.0	38

Table IV.3.6

Guam DAWR June 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	38141.8	34	4458.5	13	1053.8	9	22552.6	4	5388.4	8	8.6	23
Bottom fish	4349.6	44	832.7	53	171.9	52	2074.5	54	446.2	56	7.7	100*
Spear mix	250.4	88	5.2	88	5.2	88	31.0	88	31.0	88	48.4	0*
Spear snorkel	841.0	59	100.8	39	27.8	43	338.6	44	93.7	48	7.3	46*
Spear scuba	436.2	88	52.9	54	19.4	41	169.1	45	63.3	31	21.1	141*
Other	1014.9	88	155.2	88	20.7	88	387.9	88	51.7	88	6.5	0*
Total:	45033.9	35	5605.3	19	1217.7	12	25553.8	9	5844.5	10	7.8	17

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.7

Guam DAWR July 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	55053.5	12	7248.7	8	1340.0	10	29132.4	11	5270.4	13	8.9	15
Bottom fish	7245.4	39	1483.8	26	280.6	39	4150.9	40	814.9	52	4.9	24
Atulai jig	751.0	65	246.5	68	67.8	69	493.0	68	135.5	69	3.4	0*
Spear snorkel	6545.0	72	376.0	79	122.3	61	2130.4	83	642.2	69	22.2	4*
Spear scuba	792.2	66	24.1	71	21.0	65	89.1	74	74.2	67	36.8	0*
Other	1277.3	95	178.8	95	44.7	95	536.5	95	134.1	95	7.1	0*
Total:	71664.5	11	9557.9	7	1650.6	7	36532.3	10	6344.8	11	8.5	12

Table IV.3.8

Guam DAWR August 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	54636.6	35	2940.4	21	705.1	8	11409.0	9	2804.5	7	14.2	17
Bottom fish	1022.1	71	201.6	38	80.5	64	619.1	44	264.0	69	4.4	148*
Spear mix	238.2	96	26.7	96	26.7	96	80.2	96	80.2	96	8.9	0*
Total:	55896.9	35	3168.7	22	771.4	14	12108.3	11	2958.8	4	13.6	14

Table IV.3.9

Guam DAWR September 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	49215.0	9	4649.3	9	1116.8	10	17081.2	9	4112.7	10	10.5	13
Bottom fish	8218.8	35	1280.9	8	314.2	12	3311.0	10	794.5	17	6.8	58
Atulai jig	640.4	88	327.1	40	49.2	49	981.3	40	147.5	49	1.4	130*
Spear snorkel	0	0	4.3	95	17.3	95	4.3	95	17.3	95	0	0*
Total:	58074.2	12	6261.6	6	1301.6	6	21377.8	7	4562.0	7	9.2	8

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.3.10

Guam DAWR October 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	24096.5	14	3795.6	6	1036.5	5	18072.6	18	4960.6	17	6.5	18
Bottom fish	6478.7	29	1039.1	23	254.1	34	2614.2	21	626.6	31	6.7	42
Atulai jig	4723.1	69	367.8	65	115.4	70	879.1	66	256.9	67	12.2	0*
Spear snorkel	36.1	88	8.0	88	8.0	88	48.2	88	48.2	88	4.5	0*
Spear scuba	3789.0	83	21.7	71	31.0	71	86.7	71	123.8	71	149.0	0*
Other	873.9	88	80.8	88	29.4	88	201.9	88	73.4	88	10.8	0*
Total:	39997.4	23	5312.9	7	1230.9	6	21902.6	11	5561.6	13	7.7	15

Table IV.3.11

Guam DAWR November 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	36103.0	23	4234.5	25	1018.1	17	21767.6	22	5286.9	13	10.0	27
Bottom fish	405.3	90	56.7	90	34.9	90	198.6	90	122.2	90	7.1	0*
Spear snorkel	217.5	90	6.5	90	8.7	90	39.3	90	52.4	90	33.2	0*
Spear scuba	434.0	90	13.1	90	8.7	90	65.5	90	43.7	90	33.1	0*
Total:	37159.9	20	4310.8	26	1040.4	18	22071.0	22	5379.8	13	10.1	26

Table IV.3.12

Guam DAWR December 1990
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	39539.1	34	4165.5	13	952.0	15	18855.7	12	4239.2	10	8.9	23
Bottom fish	2026.5	81	342.2	65	107.2	40	933.8	57	337.3	26	4.2	4*
Spear snorkel	211.1	91	49.5	91	19.8	91	98.9	91	39.6	91	4.3	0*
Other	10.9	91	37.2	91	9.9	91	148.7	91	39.7	91	.3	0*
Total:	41787.6	29	4594.4	8	1007.0	15	20037.1	8	4385.9	10	8.8	23

* Not enough data to properly compute Coefficient of Variation (CV).

Table IV.4.1

Guam DAWR January 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Grouper	33.8	0.18	0	0	14.0	12.01	19.8	8.12
Jacks	141.1	0.75	0	0	0	0	141.1	58.00
Rainbow runner	80.0	0.42	80.0	0.43	0	0	0	0
Dolphinfish (mahimahi)	8773.4	46.46	8773.4	47.37	0	0	0	0
Yellowtail kalikali	7.0	0.04	0	0	7.0	6.00	0	0
Yelloweye opakapaka	4.8	0.03	0	0	4.8	4.12	0	0
Emperors	88.2	0.47	0	0	79.5	67.92	8.8	3.60
Goatfish	11.6	0.06	0	0	11.6	9.95	0	0
Barracuda	159.9	0.85	159.9	0.86	0	0	0	0
Wrasse	17.8	0.09	0	0	0	0	17.8	7.31
Surgeonfish and tangs	47.7	0.25	0	0	0	0	47.7	19.61
Rabbitfish	8.2	0.04	0	0	0	0	8.2	3.36
Wahoo	2762.1	14.63	2762.1	14.91	0	0	0	0
Kawakawa	898.4	4.76	898.4	4.85	0	0	0	0
Skipjack tuna	4921.0	26.06	4921.0	26.57	0	0	0	0
Yellowfin tuna	926.8	4.91	926.8	5.00	0	0	0	0
Total all species:	18881.9	100.00	18521.6	98.09	117.0	0.62	243.3	1.29

Table IV.4.2

Guam DAWR February 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	13.3	0.02	0	0	0	0	13.3	1.11
Grouper	443.5	0.77	0	0	265.1	20.77	178.4	14.95
Cardinalfish	5.3	0.01	0	0	5.3	0.41	0	0
Jacks	141.2	0.24	0	0	79.4	6.22	61.7	5.17
Rainbow runner	181.5	0.31	127.2	0.23	54.3	4.25	0	0
Dolphinfish (mahimahi)	37485.5	64.71	37485.5	67.59	0	0	0	0
Snappers	105.0	0.18	0	0	11.3	0.88	93.8	7.86
Uku (jobfish)	173.7	0.30	0	0	173.7	13.61	0	0
Blue lined snapper	6.3	0.01	0	0	6.3	0.49	0	0
Yellowtail kalikali	15.3	0.03	0	0	15.3	1.20	0	0
Yelloweye opakapaka	57.6	0.10	0	0	57.6	4.52	0	0
Gindai (flower snapper)	50.1	0.09	0	0	50.1	3.93	0	0
Sweetlips	34.3	0.06	0	0	0	0	34.3	2.87
Emperors	603.2	1.04	0	0	469.5	36.78	133.7	11.21
Goatfish	39.3	0.07	0	0	39.3	3.08	0	0
Rudderfish	14.9	0.03	0	0	0	0	14.9	1.25
Barracuda	52.9	0.09	52.9	0.10	0	0	0	0
Parrotfish	244.9	0.42	0	0	0	0	244.9	20.53
Surgeonfish and tangs	359.0	0.62	0	0	0	0	359.0	30.09
Rabbitfish	34.1	0.06	0	0	0	0	34.1	2.86
Wahoo	5341.4	9.22	5341.4	9.63	0	0	0	0
Kawakawa	176.2	0.30	176.2	0.32	0	0	0	0
Dogtooth tuna	135.1	0.23	135.1	0.24	0	0	0	0
Skipjack tuna	4216.7	7.28	4216.7	7.60	0	0	0	0
Yellowfin tuna	4037.6	6.97	4037.6	7.28	0	0	0	0
Blue marlin	3890.8	6.72	3890.8	7.02	0	0	0	0
Triggerfish	11.5	0.02	0	0	11.5	0.90	0	0
Shallow bottom fish	37.6	0.06	0	0	37.6	2.95	0	0
Spiny lobsters	25.2	0.04	0	0	0	0	25.2	2.11
Total all species:	57932.7	100.00	55463.2	95.74	1276.3	2.20	1193.2	2.06

Table IV.4.3

Guam DAWR March 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	6.7	0.01	0	0	6.7	0.21	0	0
Grouper	398.3	0.47	0	0	257.4	8.24	140.9	7.60
Jacks	544.4	0.65	331.8	0.42	212.6	6.81	0	0
Rainbow runner	80.4	0.10	80.4	0.10	0	0	0	0
Bigeye scad (akule)	542.9	0.65	0	0	0	0	542.9	29.28
Dolphinfish (mahimahi)	24196.5	28.78	24042.4	30.39	154.1	4.93	0	0
Snappers	290.8	0.35	241.3	0.31	20.7	0.66	28.9	1.56
Lehi (silvermouth)	15.7	0.02	0	0	15.7	0.50	0	0
Uku (jobfish)	203.9	0.24	0	0	203.9	6.53	0	0
Ehu (pink snapper)	120.9	0.14	0	0	120.9	3.87	0	0
Blue lined snapper	4.4	0.01	0	0	4.4	0.14	0	0
Yellowtail kalikali	39.3	0.05	0	0	39.3	1.26	0	0
Opakapaka (pink snap)	735.6	0.87	0	0	735.6	23.56	0	0
Yelloweye opakapaka	477.6	0.57	0	0	477.6	15.29	0	0
Gindai (flower snapper)	309.3	0.37	0	0	309.3	9.90	0	0
Fusilier	4.0	0	0	0	0	0	4.0	0.22
Sweetlips	9.9	0.01	0	0	0	0	9.9	0.53
Emperors	537.8	0.64	0	0	531.5	17.02	6.3	0.34
Goatfish	35.8	0.04	0	0	14.0	0.45	21.8	1.18
Barracuda	1150.1	1.37	1150.1	1.45	0	0	0	0
Wrasse	229.8	0.27	0	0	7.0	0.22	222.8	12.02
Parrotfish	493.5	0.59	0	0	0	0	493.5	26.62
Surgeonfish and tangs	367.5	0.44	0	0	12.4	0.40	355.1	19.15
Rabbitfish	22.7	0.03	0	0	0	0	22.7	1.22
Wahoo	27138.4	32.28	27138.4	34.31	0	0	0	0
Kawakawa	187.4	0.22	187.4	0.24	0	0	0	0
Dogtooth tuna	259.0	0.31	259.0	0.33	0	0	0	0
Skipjack tuna	14914.5	17.74	14914.5	18.85	0	0	0	0
Yellowfin tuna	3261.3	3.88	3261.3	4.12	0	0	0	0
Sailfish	1487.9	1.77	1487.9	1.88	0	0	0	0
Blue marlin	6007.9	7.15	6007.9	7.60	0	0	0	0
Octopus	5.5	0.01	0	0	0	0	5.5	0.29
Total all species:	84079.8	100.00	79102.5	94.08	3123.0	3.71	1854.3	2.21

Table IV.4.4

Guam DAWR April 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
RAYS	83.7	0.12	0	0	0	0	83.7	1.71
FLYINGFISH	2.3	0	0	0	2.3	0.07	0	0
SQUIRRELFISH	110.2	0.16	0	0	41.4	1.20	68.7	1.41
GROUPER	440.6	0.64	0	0	374.4	10.83	66.3	1.35
BIGEYES	25.1	0.04	0	0	0	0	25.1	0.51
JACKS	484.8	0.71	25.1	0.04	326.0	9.43	133.7	2.73
RAINBOW RUNNER	146.6	0.21	146.6	0.24	0	0	0	0
BIGEYE SCAD (AKULE)	562.1	0.82	0	0	3.1	0.09	559.1	11.43
DOLPHINFISH (MAHIMAHI)	16086.4	23.40	16086.4	26.64	0	0	0	0
SNAPPERS	361.9	0.53	118.3	0.20	190.6	5.51	52.9	1.08
UKU (JOBFISH)	830.7	1.21	0	0	830.7	24.03	0	0
EHU (PINK SNAPPER)	16.5	0.02	0	0	16.5	0.48	0	0
BLUE LINED SNAPPER	28.0	0.04	0	0	25.1	0.73	2.8	0.06
YELLOWTAIL KALIKALI	35.4	0.05	0	0	35.4	1.02	0	0
YELLOWEYE OPAKAPAKA	18.1	0.03	0	0	18.1	0.52	0	0
KALIKALI (PINK SNAPPER)	22.4	0.03	0	0	22.4	0.65	0	0
GINDAI (FLOWER SNAPPER)	22.2	0.03	0	0	22.2	0.64	0	0
MOHARRA	1093.7	1.59	0	0	0	0	1093.7	22.36
EMPERORS	1250.7	1.82	0	0	1019.6	29.50	231.1	4.73
GOATFISH	132.6	0.19	0	0	69.7	2.01	62.9	1.29
SWEEPERS	5.0	0.01	0	0	0	0	5.0	0.10
DAMSELFISHES	23.1	0.03	0	0	0	0	23.1	0.47
MULLET	55.8	0.08	0	0	0	0	55.8	1.14
BARRACUDA	791.4	1.15	674.3	1.12	60.9	1.76	56.1	1.15
WRASSE	1652.9	2.40	0	0	321.6	9.30	1331.3	27.22
PARROTFISH	24.6	0.04	0	0	0	0	24.6	0.50
SURGEONFISH AND TANGS	261.8	0.38	0	0	18.1	0.52	243.7	4.98
RABBITFISH	43.7	0.06	0	0	0	0	43.7	0.89
TUNAS	24.4	0.04	24.4	0.04	0	0	0	0
WAHOO	4170.3	6.07	4170.3	6.91	0	0	0	0
KAWAKAWA	219.8	0.32	219.8	0.36	0	0	0	0
DOGTOOTH TUNA	556.4	0.81	556.4	0.92	0	0	0	0
SKIPJACK TUNA	13758.6	20.02	13758.6	22.78	0	0	0	0
YELLOWFIN TUNA	12356.9	17.98	12356.9	20.46	0	0	0	0
BLUE MARLIN	12249.4	17.82	12249.4	20.29	0	0	0	0
TRIGGERFISH	58.5	0.09	0	0	58.5	1.69	0	0
ASSORTED REEF FISH	34.8	0.05	0	0	0	0	34.8	0.71
MOLLUSKS	677.3	0.99	0	0	0	0	677.3	13.85
SPINY LOBSTERS	8.2	0.01	0	0	0	0	8.2	0.17
SLIPPER LOBSTERS	6.8	0.01	0	0	0	0	6.8	0.14
TOTAL ALL SPECIES:	68733.8	100.00	60386.6	87.86	3456.6	5.03	4890.6	7.12

Table IV.4.5

Guam DAWR May 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	58.9	0.12	0	0	58.9	0.88	0	0
Lizardfish	4.5	0.01	0	0	4.5	0.07	0	0
Squirrelfish	188.3	0.38	0	0	188.3	2.80	0	0
Grouper	514.5	1.05	0	0	514.5	7.65	0	0
Jacks	827.0	1.69	0	0	779.8	11.59	47.1	7.47
Rainbow runner	345.5	0.70	345.5	0.83	0	0	0	0
Bigeye scad (akule)	188.6	0.38	0	0	0	0	188.6	29.90
Dolphinfish (mahimahi)	3135.1	6.39	3135.1	7.52	0	0	0	0
Snappers	330.3	0.67	0	0	330.3	4.91	0	0
Lehi (silvermouth)	21.1	0.04	0	0	21.1	0.31	0	0
Uku (jobfish)	395.2	0.81	0	0	395.2	5.87	0	0
Ehu (pink snapper)	84.5	0.17	0	0	84.5	1.26	0	0
Blue lined snapper	220.4	0.45	0	0	220.4	3.28	0	0
Yellowtail kalikali	325.5	0.66	0	0	325.5	4.84	0	0
Opakapaka (pink snap)	295.9	0.60	0	0	295.9	4.40	0	0
Yelloweye opakapaka	27.2	0.06	0	0	27.2	0.40	0	0
Gindai (flower snapper)	170.0	0.35	0	0	170.0	2.53	0	0
Emperors	2617.9	5.34	0	0	2617.9	38.92	0	0
Goatfish	251.0	0.51	0	0	222.8	3.31	28.2	4.48
Hawkfish	2.1	0	0	0	2.1	0.03	0	0
Barracuda	806.2	1.64	683.9	1.64	122.2	1.82	0	0
Wrasse	123.5	0.25	0	0	103.3	1.53	20.2	3.20
Parrotfish	23.2	0.05	0	0	0	0	23.2	3.68
Sand perch	2.7	0.01	0	0	2.7	0.04	0	0
Surgeonfish and tangs	194.2	0.40	0	0	69.4	1.03	124.8	19.78
Rabbitfish	38.2	0.08	0	0	0	0	38.2	6.05
Wahoo	5406.3	11.02	5406.3	12.97	0	0	0	0
Kawakawa	106.8	0.22	106.8	0.26	0	0	0	0
Dogtooth tuna	219.9	0.45	219.9	0.53	0	0	0	0
Skipjack tuna	8195.8	16.71	8195.8	19.66	0	0	0	0
Yellowfin tuna	8560.2	17.46	8560.2	20.54	0	0	0	0
Blue marlin	15028.3	30.65	15028.3	36.05	0	0	0	0
Triggerfish	19.6	0.04	0	0	19.6	0.29	0	0
Shallow bottom fish	151.0	0.31	0	0	151.0	2.24	0	0
Octopus	90.9	0.19	0	0	0	0	90.9	14.41
Spiny lobsters	53.7	0.11	0	0	0	0	53.7	8.51
Crabs	15.9	0.03	0	0	0	0	15.9	2.52
Total all species:	49039.8	100.00	41681.8	85.00	6727.2	13.72	630.7	1.29

Table IV.4.6

Guam DAWR June 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	907.3	2.01	0	0	907.3	20.86	0	0
Squirrelfish	314.5	0.70	0	0	309.5	7.12	5.0	0.20
Grouper	400.8	0.89	0	0	277.4	6.38	123.4	4.85
Bigeyes	88.8	0.20	0	0	88.8	2.04	0	0
Jacks	95.8	0.21	5.3	0.01	86.5	1.99	3.9	0.15
Rainbow runner	66.6	0.15	66.6	0.17	0	0	0	0
Dolphinfish (mahimahi)	1546.7	3.43	1546.7	4.06	0	0	0	0
Snappers	165.0	0.37	6.4	0.02	139.4	3.20	19.3	0.76
Lehi (silvermouth)	262.6	0.58	0	0	262.6	6.04	0	0
Uku (jobfish)	25.0	0.06	0	0	25.0	0.57	0	0
Ehu (pink snapper)	165.0	0.37	0	0	165.0	3.79	0	0
Onaga (red snapper)	592.7	1.32	0	0	592.7	13.63	0	0
Blue lined snapper	41.3	0.09	0	0	41.3	0.95	0	0
Yellowtail kalikali	142.5	0.32	0	0	142.5	3.28	0	0
Opakapaka (pink snap)	75.0	0.17	0	0	75.0	1.72	0	0
Gindai (flower snapper)	260.1	0.58	0	0	260.1	5.98	0	0
Fusilier	3.8	0.01	0	0	0	0	3.8	0.15
Moharra	73.9	0.16	0	0	0	0	73.9	2.91
Emperors	879.0	1.95	0	0	760.5	17.48	118.5	4.66
Goatfish	64.3	0.14	0	0	33.5	0.77	30.8	1.21
Sweepers	70.0	0.16	0	0	70.0	1.61	0	0
Mullet	75.8	0.17	0	0	0	0	75.8	2.98
Barracuda	295.6	0.66	295.6	0.77	0	0	0	0
Wrasse	208.4	0.46	0	0	10.0	0.23	198.4	7.80
Parrotfish	560.5	1.24	0	0	0	0	560.5	22.04
Surgeonfish and tangs	824.0	1.83	0	0	0	0	824.0	32.41
Rabbitfish	152.4	0.34	0	0	0	0	152.4	5.99
Wahoo	566.9	1.26	566.9	1.49	0	0	0	0
Kawakawa	21.8	0.05	21.8	0.06	0	0	0	0
Skipjack tuna	7338.7	16.30	7338.7	19.24	0	0	0	0
Yellowfin tuna	5104.9	11.34	5104.9	13.38	0	0	0	0
Blue marlin	23188.8	51.49	23188.8	60.80	0	0	0	0
Triggerfish	87.9	0.20	0	0	77.5	1.78	10.4	0.41
Filefish	8.6	0.02	0	0	0	0	8.6	0.34
Tripletooth puffers	25.0	0.06	0	0	25.0	0.57	0	0
Mollusks	178.2	0.40	0	0	0	0	178.2	7.01
Octopus	15.7	0.03	0	0	0	0	15.7	0.62
Spiny lobsters	79.5	0.18	0	0	0	0	79.5	3.13
Slipper lobsters	22.3	0.05	0	0	0	0	22.3	0.88
Crabs	38.2	0.08	0	0	0	0	38.2	1.50
Total all species:	45033.9	100.00	38141.8	84.70	4349.6	9.66	2542.5	5.65

Table IV.4.7

Guam DAWR July 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	248.8	0.35	0	0	248.8	3.43	0	0
Squirrelfish	197.8	0.28	0	0	36.6	0.50	161.2	1.72
Grouper	1195.0	1.67	0	0	1136.8	15.69	58.2	0.62
Jacks	1001.8	1.40	21.9	0.04	517.9	7.15	462.0	4.93
Rainbow runner	53.5	0.07	53.5	.10	0	0	0	0
Bigeye scad (akule)	751.0	1.05	0	0	0	0	751.0	8.02
Dolphinfish (mahimahi)	656.2	0.92	656.2	1.19	0	0	0	0
Snappers	797.5	1.11	125.9	0.23	256.2	3.54	415.3	4.43
Lehi (silvermouth)	470.4	0.66	0	0	470.4	6.49	0	0
Uku (jobfish)	631.2	0.88	0	0	631.2	8.71	0	0
Ehu (pink snapper)	81.6	0.11	0	0	81.6	1.13	0	0
Onaga (red snapper)	169.9	0.24	0	0	169.9	2.35	0	0
Blue lined snapper	20.1	0.03	0	0	9.1	0.13	11.0	0.12
Yellowtail kalikali	336.2	0.47	0	0	336.2	4.64	0	0
Yelloweye opakapaka	183.3	0.26	0	0	183.3	2.53	0	0
Gindai (flower snapper)	464.1	0.65	0	0	464.1	6.41	0	0
Emperors	2153.6	3.00	0	0	2117.5	29.23	36.1	0.39
Goatfish	689.2	0.96	0	0	31.4	0.43	657.8	7.02
Rudderfish	351.6	0.49	0	0	0	0	351.6	3.75
Barracuda	465.7	0.65	350.4	0.64	115.3	1.59	0	0
Wrasse	89.1	0.12	0	0	0	0	89.1	0.95
Parrotfish	924.8	1.29	0	0	0	0	924.8	9.87
Surgeonfish and tangs	2155.1	3.01	0	0	36.4	0.50	2118.7	22.62
Tunas	56.2	0.08	56.2	0.10	0	0	0	0
Wahoo	1124.8	1.57	1124.8	2.04	0	0	0	0
Kawakawa	917.2	1.28	917.2	1.67	0	0	0	0
Skipjack tuna	12462.8	17.39	12462.8	22.64	0	0	0	0
Yellowfin tuna	4896.8	6.83	4896.8	8.89	0	0	0	0
Sailfish	65.9	0.09	65.9	0.12	0	0	0	0
Blue marlin	34321.2	47.89	34321.2	62.34	0	0	0	0
Triggerfish	168.8	0.23	0	0	71.9	0.99	96.9	1.04
Porcupinefish	118.8	0.17	0	0	0	0	118.8	1.27
Assorted bottom fish	1092.6	1.52	0	0	0	0	1092.6	11.67
Shallow bottom fish	330.8	0.46	0	0	330.8	4.57	0	0
Assorted reef fish	400.5	0.56	0	0	0	0	400.5	4.28
Mollusks	1619.8	2.26	0	0	0	0	1619.8	17.29
Total all species:	71664.5	100.00	55053.5	76.82	7245.4	10.11	9365.6	13.07

Table IV.4.8

Guam DAWR August 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Needlefish	298.1	0.53	298.1	0.55	0	0	0	0
Squirrelfish	8.1	0.01	0	0	8.1	0.80	0	0
Grouper	211.4	0.38	0	0	211.4	20.68	0	0
False whiting	3.8	0.01	0	0	3.8	0.37	0	0
Jacks	4.7	0.01	0	0	4.7	0.46	0	0
Rainbow runner	38.3	0.07	38.3	0.07	0	0	0	0
Dolphinfish (mahimahi)	425.9	0.76	425.9	0.78	0	0	0	0
Snappers	3.0	0.01	0	0	3.0	0.30	0	0
Uku (jobfish)	127.2	0.23	0	0	127.2	12.45	0	0
Emperors	585.4	1.05	0	0	585.4	57.27	0	0
Goatfish	24.4	0.04	0	0	24.4	2.39	0	0
Barracuda	42.6	0.08	42.6	0.08	0	0	0	0
Wrasse	90.8	0.16	0	0	0	0	90.8	38.12
Parrotfish	87.9	0.16	0	0	0	0	87.9	36.88
Surgeonfish and tangs	59.5	0.11	0	0	0	0	59.5	25.00
Wahoo	289.6	0.52	289.6	0.53	0	0	0	0
Kawakawa	1967.0	3.52	1967.0	3.60	0	0	0	0
Dogtooth tuna	655.8	1.17	655.8	1.20	0	0	0	0
Skipjack tuna	34038.5	60.90	34038.5	62.30	0	0	0	0
Yellowfin tuna	3551.6	6.35	3551.6	6.50	0	0	0	0
Blue marlin	13329.2	23.85	13329.2	24.40	0	0	0	0
Triggerfish	16.3	0.03	0	0	16.3	1.59	0	0
Shallow bottom fish	37.8	0.07	0	0	37.8	3.70	0	0
Total all species:	55896.9	100.00	54636.6	97.75	1022.1	1.83	238.2	0.43

Table IV.4.9

Guam DAWR September 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	658.5	1.13	0	0	658.5	8.01	0	0
Squirrelfish	57.0	0.10	0	0	57.0	0.69	0	0
Grouper	602.2	1.04	0	0	602.2	7.33	0	0
Jacks	954.8	1.64	0	0	954.8	11.62	0	0
Rainbow runner	75.0	0.13	75.0	0.15	0	0	0	0
Bigeye scad (akule)	461.1	0.79	11.2	0.02	0	0	449.9	70.26
Dolphinfish (mahimahi)	1793.3	3.09	1793.3	3.64	0	0	0	0
Snappers	289.1	0.50	0	0	289.1	3.52	0	0
Lehi (silvermouth)	322.7	0.56	0	0	322.7	3.93	0	0
Uku (jobfish)	317.7	0.55	0	0	317.7	3.87	0	0
Ehu (pink snapper)	204.8	0.35	0	0	204.8	2.49	0	0
Onaga (red snapper)	464.2	0.80	0	0	464.2	5.65	0	0
Blue lined snapper	47.1	0.08	0	0	47.1	0.57	0	0
Yellowtail kalikali	827.1	1.42	0	0	827.1	10.06	0	0
Opakapaka (pink snap)	82.3	0.14	0	0	82.3	1.00	0	0
Yelloweye opakapaka	112.3	0.19	0	0	112.3	1.37	0	0
Gindai (flower snapper)	648.6	1.12	0	0	648.6	7.89	0	0
Emperors	1537.0	2.65	0	0	1537.0	18.70	0	0
Goatfish	92.8	0.16	0	0	92.8	1.13	0	0
Barracuda	301.1	0.52	250.1	0.51	0	0	51.1	7.98
Wrasse	161.3	0.28	0	0	161.3	1.96	0	0
Surgeonfish and tangs	23.0	0.04	0	0	23.0	0.28	0	0
Oilfish	32.9	0.06	0	0	32.9	0.40	0	0
Tunas	35.7	0.06	35.7	0.07	0	0	0	0
Wahoo	1943.3	3.35	1943.3	3.95	0	0	0	0
Kawakawa	1516.4	2.61	1516.4	3.08	0	0	0	0
Dogtooth tuna	238.1	0.41	0	0	98.8	1.20	139.3	21.76
Skipjack tuna	20746.9	35.72	20746.9	42.16	0	0	0	0
Yellowfin tuna	11390.5	19.61	11390.5	23.14	0	0	0	0
Sailfish	2500.6	4.31	2500.6	5.08	0	0	0	0
Blue marlin	8952.1	15.41	8952.1	18.19	0	0	0	0
Triggerfish	22.7	0.04	0	0	22.7	0.28	0	0
Tripletooth puffers	49.4	0.09	0	0	49.4	0.60	0	0
Shallow bottom fish	612.4	1.05	0	0	612.4	7.45	0	0
Total all species:	58074.2	100.00	49215.0	84.75	8218.8	14.15	640.4	1.10

Table IV.4.10

Guam DAWR October 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Sharks	307.2	0.77	0	0	307.2	4.74	0	0
Pike eels	15.0	0.04	0	0	15.0	0.23	0	0
Needlefish	37.5	0.09	0	0	37.5	0.58	0	0
Squirrelfish	81.0	0.20	0	0	69.8	1.08	11.2	0.12
Cornetfish	5.9	0.01	0	0	0	0	5.9	0.06
Grouper	636.6	1.59	0	0	605.2	9.34	31.4	0.33
Jacks	477.6	1.19	0	0	97.4	1.50	380.2	4.04
Bigeye scad (akule)	3853.6	9.63	0	0	0	0	3853.6	40.90
Dolphinfish (mahimahi)	6717.7	16.80	6717.7	27.88	0	0	0	0
Snappers	537.3	1.34	0	0	487.4	7.52	49.9	0.53
Lehi (silvermouth)	348.4	0.87	0	0	348.4	5.38	0	0
Uku (jobfish)	455.1	1.14	0	0	342.8	5.29	112.3	1.19
Ehu (pink snapper)	140.9	0.35	0	0	140.9	2.17	0	0
Onaga (red snapper)	104.9	0.26	0	0	104.9	1.62	0	0
Blue lined snapper	160.7	0.40	0	0	160.7	2.48	0	0
Yellowtail kalikali	337.5	0.84	0	0	337.5	5.21	0	0
Opakapaka (pink snap)	1303.7	3.26	0	0	1303.7	20.12	0	0
Yelloweye opakapaka	226.7	0.57	0	0	226.7	3.50	0	0
Gindai (flower snapper)	185.4	0.46	0	0	185.4	2.86	0	0
Emperors	1871.2	4.68	0	0	1231.9	19.02	639.2	6.78
Goatfish	379.2	0.95	0	0	71.9	1.11	307.3	3.26
Rudderfish	25.1	0.06	0	0	0	0	25.1	0.27
Mullet	53.3	0.13	0	0	0	0	53.3	0.57
Barracuda	437.0	1.09	53.8	0.22	110.5	1.71	272.6	2.89
Wrasse	104.9	0.26	0	0	104.9	1.62	0	0
Parrotfish	2673.9	6.69	0	0	0	0	2673.9	28.38
Surgeonfish and tangs	818.6	2.05	0	0	27.7	0.43	790.9	8.39
Rabbitfish	71.6	0.18	0	0	0	0	71.6	0.76
Wahoo	3611.4	9.03	3611.4	14.99	0	0	0	0
Kawakawa	32.3	0.08	32.3	0.13	0	0	0	0
Dogtooth tuna	197.4	0.49	197.4	0.82	0	0	0	0
Skipjack tuna	6036.7	15.09	6036.7	25.05	0	0	0	0
Yellowfin tuna	7447.1	18.62	7447.1	30.91	0	0	0	0
Triggerfish	30.0	0.07	0	0	30.0	0.46	0	0
Filefish	10.4	0.03	0	0	0	0	10.4	0.11
Shallow bottom fish	131.1	0.33	0	0	131.1	2.02	0	0
Spiny lobsters	105.2	0.26	0	0	0	0	105.2	1.12
Crabs	28.0	0.07	0	0	0	0	28.0	0.30
Total all species:	39997.4	100.00	24096.5	60.25	6478.7	16.20	9422.2	23.56

Table IV.4.11

Guam DAWR November 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Squirrelfish	6.7	0.02	0	0	0	0	6.7	1.03
Grouper	67.2	0.18	0	0	55.1	13.59	12.1	1.85
Bigeyes	6.9	0.02	0	0	0	0	6.9	1.06
Rainbow runner	79.0	0.21	79.0	0.22	0	0	0	0
Dolphinfish (mahimahi)	10981.2	29.55	10981.2	30.42	0	0	0	0
Snappers	18.2	0.05	0	0	18.2	4.48	0	0
Lehi (silvermouth)	6.6	0.02	0	0	6.6	1.63	0	0
Uku (jobfish)	76.3	0.21	0	0	76.3	18.83	0	0
Blue lined snapper	6.0	0.02	0	0	6.0	1.48	0	0
Yellowtail kalikali	122.6	0.33	0	0	122.6	30.24	0	0
Gindai (flower snapper)	16.9	0.05	0	0	16.9	4.17	0	0
Emperors	103.4	0.28	0	0	99.1	24.46	4.3	0.65
Goatfish	14.4	0.04	0	0	4.5	1.12	9.9	1.52
Rudderfish	29.7	0.08	0	0	0	0	29.7	4.56
Butterflyfish	4.1	0.01	0	0	0	0	4.1	0.64
Barracuda	280.5	0.75	280.5	0.78	0	0	0	0
Parrotfish	125.4	0.34	0	0	0	0	125.4	19.24
Surgeonfish and tangs	426.0	1.15	0	0	0	0	426.0	65.38
Rabbitfish	4.0	0.01	0	0	0	0	4.0	0.61
Wahoo	13572.3	36.52	13572.3	37.59	0	0	0	0
Kawakawa	194.7	0.52	194.7	0.54	0	0	0	0
Skipjack tuna	6672.9	17.96	6672.9	18.48	0	0	0	0
Yellowfin tuna	1110.2	2.99	1110.2	3.08	0	0	0	0
Blue marlin	2765.7	7.44	2765.7	7.66	0	0	0	0
Shortbill spearfish	446.5	1.20	446.5	1.24	0	0	0	0
Mollusks	2.6	0.01	0	0	0	0	2.6	0.40
Octopus	19.8	0.05	0	0	0	0	19.8	3.04
Total all species:	37159.9	100.00	36103.0	97.16	405.3	1.09	651.5	1.75

Table IV.4.12

Guam DAWR December 1990
Offshore Creel Survey Species Composition

Common Name	Total all gears	% all gears	trolling	% this gear	bottom	% this gear	other	% this gear
Lanterneyefish	243.7	0.58	0	0	243.7	12.03	0	0
Grouper	104.6	0.25	0	0	104.6	5.16	0	0
Rainbow runner	41.7	0.10	41.7	0.11	0	0	0	0
Dolphinfish (mahimahi)	19413.9	46.46	19413.9	49.10	0	0	0	0
Snappers	32.5	0.08	0	0	32.5	1.60	0	0
Lehi (silvermouth)	103.8	0.25	0	0	103.8	5.12	0	0
Ehu (pink snapper)	279.8	0.67	0	0	279.8	13.81	0	0
Blue lined snapper	14.4	0.03	0	0	14.4	0.71	0	0
Yellowtail kalikali	315.5	0.75	0	0	315.5	15.57	0	0
Opakapaka (pink snap)	412.9	0.99	0	0	412.9	20.38	0	0
Yelloweye opakapaka	97.9	0.23	0	0	97.9	4.83	0	0
Kalikali (pink snapper)	23.5	0.06	0	0	23.5	1.16	0	0
Gindai (flower snapper)	27.1	0.06	0	0	27.1	1.34	0	0
Emperors	266.8	0.64	0	0	260.2	12.84	6.6	2.97
Goatfish	81.2	0.19	0	0	81.2	4.01	0	0
Rudderfish	113.6	0.27	0	0	0	0	113.6	51.17
Mullet	10.9	0.03	0	0	0	0	10.9	4.92
Barracuda	178.9	0.43	178.9	0.45	0	0	0	0
Wrasse	29.3	0.07	0	0	29.3	1.45	0	0
Surgeonfish and tangs	90.9	0.22	0	0	0	0	90.9	40.94
Wahoo	7218.1	17.27	7218.1	18.26	0	0	0	0
Kawakawa	651.4	1.56	651.4	1.65	0	0	0	0
Dogtooth tuna	238.6	0.57	238.6	0.60	0	0	0	0
Skipjack tuna	6525.2	15.62	6525.2	16.50	0	0	0	0
Yellowfin tuna	5271.2	12.61	5271.2	13.33	0	0	0	0
Total all species:	41787.6	100.00	39539.1	94.62	2026.5	4.85	222.0	0.53

Table IV.5.1

1990 Guam International Fishing Derby
Summary Reports

prepared by
Guam Division of Aquatic and Wildlife Resources

Derby totals

	Day 1 Jul 6	Day 2 Jul 7	Day 3 Jul 8	Derby Totals
Number of boats	85.0	101.0	91.0	123.0
Number of fishermen	280.0	349.0	331.0	960.0
Avg. men per boat	3.3	3.5	3.6	3.5
Number of lines fished	368.1	374.7	324.0	1066.8
Avg. lines per boat	4.3	3.7	3.6	3.9
Boat hours	971.3	812.0	871.6	2654.9
Fished hours	922.7	755.2	845.1	2523.0
Avg. boat trip length	10.3	7.5	7.7	8.2
Avg. time spent fishing	9.8	7.0	7.5	7.8
Fishermen hours	3195.6	2809.5	3172.6	9174.1
Line hours	3995.3	2801.6	3009.8	9806.7
Number of fish landed	231.0	283.0	100.0	615.0
Pounds landed*	4634.7	4842.2	2952.0	12428.9
Avg. catch per boat day	54.5	47.9	32.4	101.1
Avg. catch per boat hour	4.8	6.0	3.4	4.7
Avg. catch per man hour	1.5	1.7	0.9	1.4
Avg. catch per line hour	1.2	1.7	1.0	1.3

Species totals

	Day 1 - Jul 6			Day 2 - Jul 7			Day 3 - Jul 8			TOTAL		
Species	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.
Blue marlin	20	2541.4	127.2	28	2883.5	103.0	15	1986.8	132.4	63	7411.8	117.7
Sailfish	0	0	0	0	0	0	1	65.8	65.8	1	65.8	65.8
Yellowfin tuna	42	748.9	17.8	25	290.2	11.7	14	163.0	4.7	81	1201.9	14.7
Wahoo	10	171.4	17.2	6	94.8	15.8	18	283.1	15.8	34	549.3	16.1
Mahimahi	8	98.8	12.3	7	67.8	9.7	10	101.0	10.1	25	267.5	10.8
Skipjack tuna	149	989.1	6.6	187	1320.7	7.0	37	332.2	9.0	373	2642.0	7.0
Rainbow runnner	0	0	0	0	0	0	1	4.2	4.2	1	4.2	4.2
Barracuda	7	50.4	7.3	19	130.2	6.8	4	16.1	4.2	30	196.7	6.6
Totals	240	7650.1	29.8	283	4842.2	17.2	100	2912.0	29.5	623	12428.9	20.0

*Includes incidental catch.

Table IV.6.1

Guam DAWR Annual 1990
Day Inshore Creel Survey
Expansion Summary

Methods	Prsn Cnt	CV	Gear Cnt	CV	Trip Cnt	CV	Prns Hrs	CV	Gear Hrs	CV	Catch	CV
Hook & line	23409.7	7	24334.5	7	13816.0	7	75002.0	7	77954.3	7	11167.3	7
Cast net	5832.2	8	5275.6	8	4733.9	8	68169.2	8	62249.7	8	7930.0	8
Gill net	4301.4	12	2031.3	12	1819.2	12	17852.1	13	8432.1	13	8832.2	13
Surround net	459.4	43	70.6	43	70.6	43	1378.4	43	212.0	43	848.2	43
Spear-snorkel	766.9	26	754.5	26	286.9	31	2356.2	27	2321.6	28	966.5	28
Spear-scuba	37.1	100	24.7	100	24.7	100	46.4	100	30.9	100	26.5	100
Hook & gaff	547.2	43	692.3	40	270.5	37	1451.1	46	1802.6	43	314.8	43
Drag net	25.6	100	12.8	100	12.8	100	69.3	100	34.6	100	107.7	100
Other	194.7	52	194.7	52	121.3	53	450.6	50	450.6	50	280.5	50
Totals	35574.7	5	33391.4	5	21156.4	5	166775.7	5	153488.9	5	30474.1	5

Table IV.6.2

Guam DAWR Annual 1990
Night Inshore Creel Survey
Expansion Summary

Methods	Prsn Cnt	CV	Gear Cnt	CV	Trip Cnt	CV	Prns Hrs	CV	Gear Hrs	CV	Catch	CV
Hook & line	9063.6	9	8705.5	10	3904.6	10	26159.4	9	25137.8	9	3959.7	11
Cast net	96.2	47	70.5	46	70.5	46	51.2	45	38.3	45	13.3	45
Gill net	2030.3	14	875.1	13	846.7	14	7240.3	13	3109.6	13	4203.1	13
Surrond net	0	0	0	0	0	0	0	0	0	0	0	0
spear-snorkel	1324.3	22	1298.2	23	599.2	23	3639.2	20	3543.3	20	2337.9	20
Spear-scuba	97.1	64	97.1	64	36.4	64	152.8	64	152.8	64	350.1	64
Hooks & gaffs	77.0	71	77.0	71	77.0	71	77.0	71	77.0	71	77.0	71
Drag net	526.0	52	65.6	51	65.6	51	1069.7	51	135.8	50	760.3	50
Other	348.2	55	348.2	55	348.2	55	965.1	61	965.1	61	1323.1	63
Totals	13563.1	7	11537.5	8	5948.4	8	39355.1	7	33159.9	8	13024.9	10

Table IV.7.1

Guam DAWR 1990 Annual
Day Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Herrings	47.0	0.00	Rudderfish	4137.4	0.06
Moray eels	40.3	0.00	Damselfish	691.8	0.01
Lizard fish	47.0	0.00	Hawkfish	349.3	0.01
Halfbeak	3647.1	0.05	Mullets	5547.8	0.08
Squirrelfish	1074.6	0.02	Barracudas	261.9	0.00
Cornetfish	221.6	0.00	Threadfins	80.6	0.00
Scorpion fish	255.2	0.00	Wrasses	772.4	0.01
Groupers	1659.0	0.02	Parrotfish	423.1	0.01
Carinalfish	20.1	0.00	Sugeonfish	11861.3	0.18
Jacks	6266.5	0.09	Rabbitfish	6279.9	0.09
Atulai	1638.8	0.02	Flounder	20.1	0.00
Pony fish	26.9	0.00	Triggerfish	342.5	0.01
Snappers	2740.3	0.04	Porcupine fish	188.1	0.00
Breams	73.9	0.00	Unidentified	235.1	0.00
Mojarras	4641.1	0.07	Molluscs	523.9	0.01
Sweetlips	188.1	0.00	Squids	20.1	0.00
Emperors	2572.4	0.04	Octopus	2021.7	0.03
Goatfish	7556.1	0.11	Lobsters	429.9	0.01
Fingerfish	60.5	0.00	Crabs	174.6	0.00
Sweepers	13.4	0.00			
Total all species:	67164.9	1.00			

Table IV.7.2

Guam DAWR 1990 Annual
Night Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Moray eels	740.6	2.58	Damselfish	117.7	0.41
Milkfish	94.7	0.33	Mullets	1395.1	4.86
Needlefish	384.7	1.34	Barracudas	996.1	3.47
Squirrelfish	1154.0	4.02	Threadfins	390.4	1.36
Cornetfish	1.3	0.00	Wrasses	209.6	0.73
Groupers	622.9	2.17	Parrotfish	295.7	1.03
Big eyes	112.0	0.39	Surgeonfish	3674.5	12.80
Jacks	1004.7	3.50	Rabbitfish	1334.9	4.65
Atulai	1260.2	4.39	Flounders	89.0	0.31
Ponyfish	232.5	0.81	Triggerfish	89.0	0.31
Snappers	1464.1	5.10	Porcupine fish	657.4	2.29
Bream	166.5	0.58	Unidentified	3858.2	13.44
Mojarras	1386.5	4.83	Molluscs	94.7	0.33
Emperors	2066.9	7.20	Octupus	456.4	1.59
Goatfish	2928.1	10.20	Lobsters	677.5	2.36
Fingerfish	20.1	0.07	Crabs	77.5	0.27
Rudderfish	620.1	2.16	Squids	18.9	0.07
Butterfly fish	.3	0.00			
Total all species:	28706.9	1.00			

Table IV.7.3

Guam DAWR 1990 Annual
Combined Day And Night Inshore Creel Survey
Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Herrings	47.9	0.05	Goatfish	10469.2	10.92
Moray eels	776.6	0.81	Fingerfish	76.7	0.08
Milkfish	95.9	0.10	Sweepers	9.6	0.01
Lizardfish	47.9	0.05	Rudderfish	4755.2	4.96
Needlefish	383.5	0.40	Butterfly fish	28.8	0.03
Halfbeak	3643.1	3.80	Damselfish	834.1	0.87
Squirrelfish	2243.4	2.34	Hawkfish	345.1	0.36
Cornetfish	220.5	0.23	Mullets	6941.1	7.24
Scorpionfish	249.3	0.26	Barracudas	1255.9	1.31
Groupers	2281.7	2.38	Threadfins	469.8	0.49
Bigeyes	115.1	0.12	Wrasses	987.5	1.03
Cardinalfish	19.2	0.02	Parrotfish	719.0	0.75
Jacks	7267.1	7.58	Surgeonfish	15531.2	16.20
Atulai	2904.9	3.03	Rabbitfish	7612.2	7.94
Ponyfish	258.9	0.27	Flounder	105.5	0.11
Snappers	4199.2	4.38	Triggerfish	431.4	0.45
Breams	239.7	0.25	Porcupine fish	853.3	0.89
Mojarras	6030.3	6.29	Unidentified	4093.7	4.27
Sweetlips	182.2	0.19	Molluscs	613.6	0.64
Emperors	4640.2	4.84	Squids	38.3	0.04
Octopus	2483.1	2.59	Lobsters	1112.1	1.16
Crabs	249.3	0.26			
Total all species:	95871.8	99.99			

Table erroneously not updated... reflects 1989 data.

Table IV.7.4

Guam DAWR 1990 Annual Combined Offshore And Inshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Sharks	1723.9	0.26	Rays	2252.2	0.33
Herring	609.2	0.09	Bonefish	108.0	0.02
Moray eels	575.0	0.09	Pike eels	58.9	0.01
Lizardfish	2.9	0	Flying fish	162.2	0.02
Needlefish	371.3	0.05	Halfbeak	1725.7	0.26
Silversides	20.0	0	Squirrelfish	5486.8	0.81
Cornetfish	884.8	0.13	Scorpionfish	56.9	0.01
Grouper	4489.5	0.66	Flagtails	9.5	0
Bigeyes	75.1	0.01	False whiting	27.1	0
Jacks	15439.4	2.28	Jacks	2327.9	0.34
Rainbow runner	1788.0	0.26	Bigeye scad (akule)	37873.2	5.60
Dolphinfish (mahimahi)	81.2	0.01	Ponyfishes	744.1	0.11
Pomfret	197.1	0.03	Snappers	3820.1	0.57
Snappers	1896.8	0.28	Lehi (silvermouth)	1588.0	0.23
Uku (jobfish)	4152.1	0.61	Ehu (pink snapper)	1305.2	0.19
Onaga (red snapper)	635.1	0.09	Blue lined snapper	1054.8	0.16
Yellowtail kalikali	6566.3	0.97	Opakapaka (pink snap)	1115.5	0.17
Yelloweye opakapaka	1008.9	0.15	Kalikali (pink snapper)	81.3	0.01
Gindai (flower snapper)	3004.2	0.44	Fusilier	47.1	0.01
Bream	35.0	0.01	Bream	7.7	0
Moharra	11694.1	1.73	Sweetlips	1038.2	0.15
Emperors	19583.0	2.90	Goatfish	24892.9	3.68
Sweepers	11.9	0	Rudderfish	5736.3	0.85
Batfish	66.7	0.01	Butterflyfish	106.1	0.02
Angelfish	51.1	0.01	Damselfishes	745.5	0.11
Hawkfish	10.5	0	Mullet	7194.7	1.06
Barracuda	13186.2	1.95	Threadfins	319.7	0.05
Wrasse	4449.9	0.66	Parrotfish	7115.4	1.05
Surgeonfish and tangs	34274.9	5.07	Rabbitfish	14611.1	2.16
Tunas	44.8	0.01	Wahoo	111977.4	16.56
Kawakawa	1892.9	0.28	Dogtooth tuna	5450.0	0.81
Skipjack tuna	130682.2	19.33	Yellowfin tuna	34403.6	5.09
Sailfish	2190.7	0.32	Black marlin	2141.3	0.32
Blue marlin	109241.2	16.16	Flounder	988.3	0.15
Triggerfish	2427.4	0.36	Filefish	458.9	0.07
Tripletooth puffers	76.6	0.01	Porcupinefish	303.6	0.04
Assorted bottom fish	273.9	0.04	Shallow bottom fish	5439.9	0.80
Deep bottom fish	132.6	0.02	Assorted reef fish	774.6	0.11
Unidentified fish	2781.7	0.41	Mollusks	1498.5	0.22
Cuttlefish	193.6	0.03	Squid	110.7	0.02
Octopus	11067.5	1.64	Spiny lobsters	1608.9	0.24
Slipper lobsters	42.1	0.01	Crabs	1333.5	0.20
Total all species:	676032.3	100.00			

Figure IV.5.1

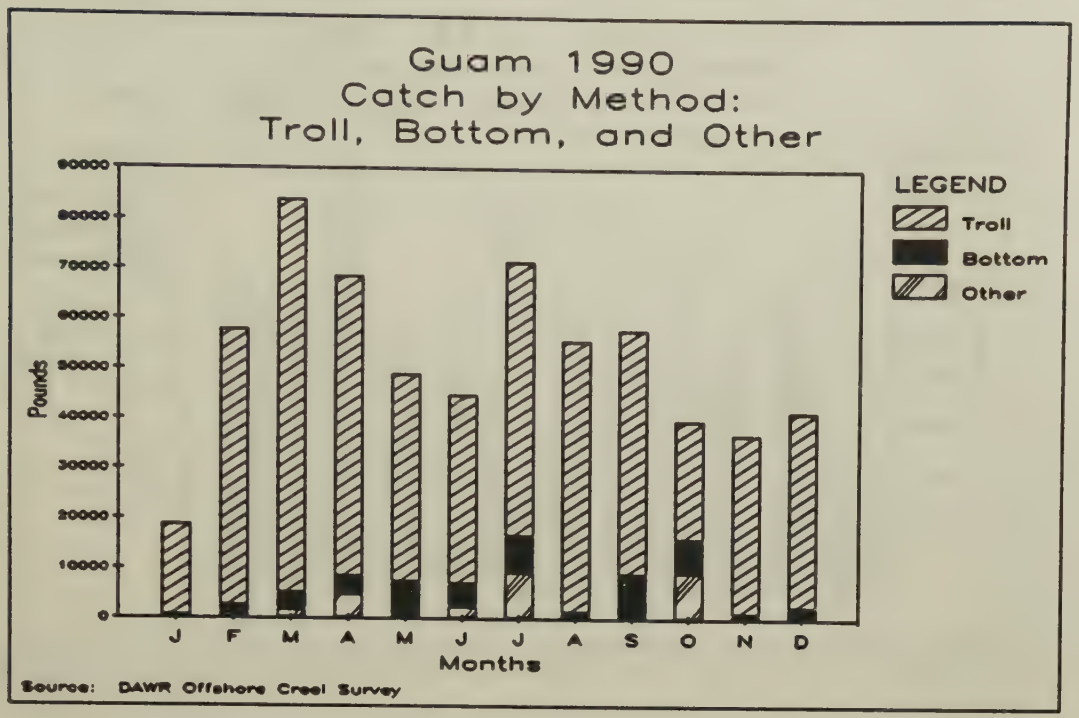


Figure IV.5.2

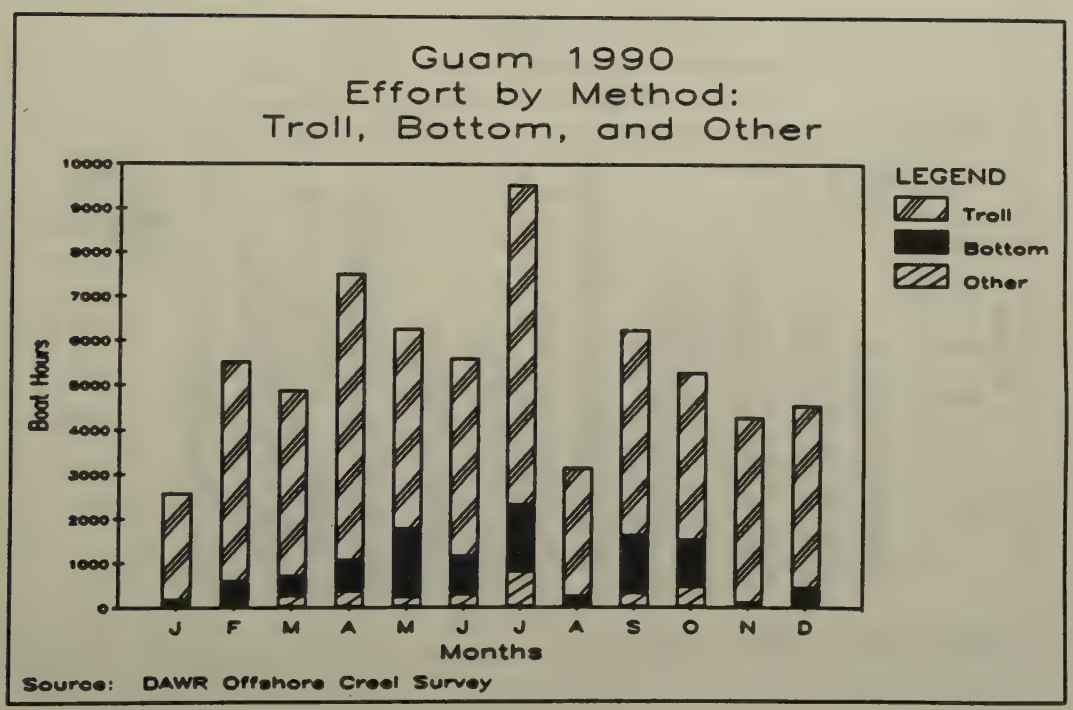


Figure IV.6.1

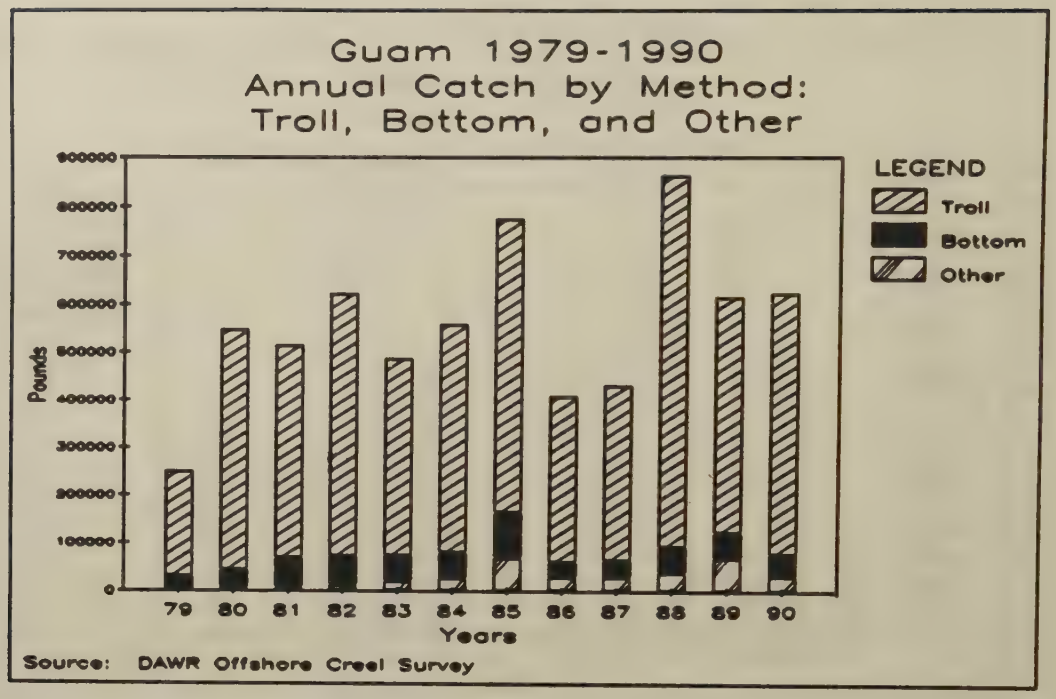


Figure IV.6.2

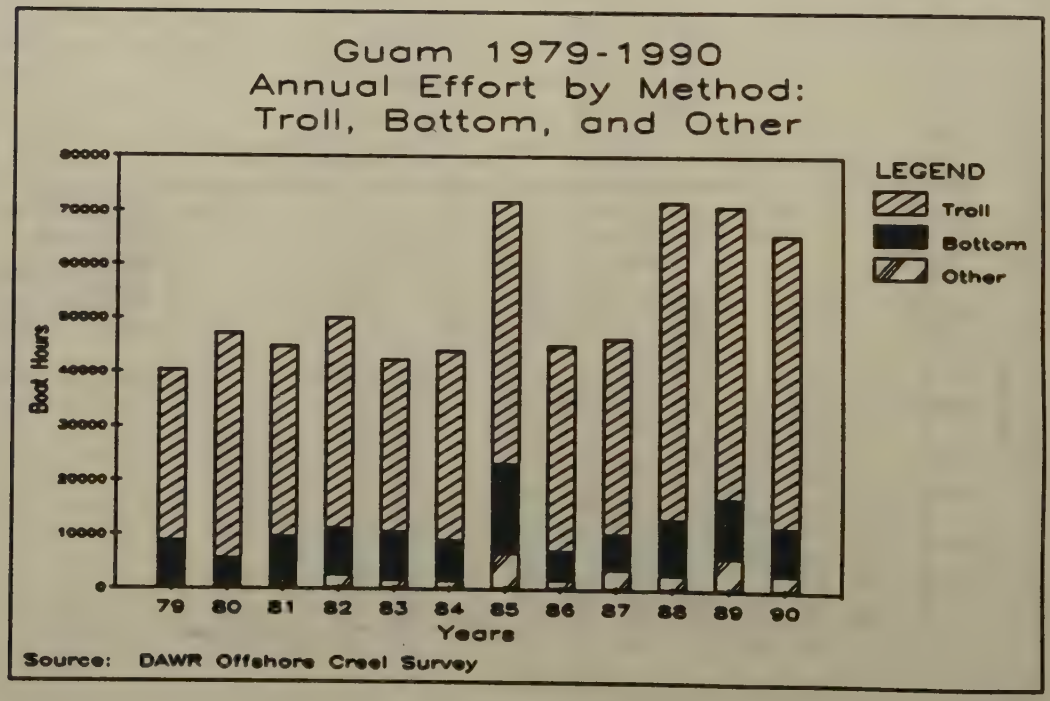


Figure IV.7.1

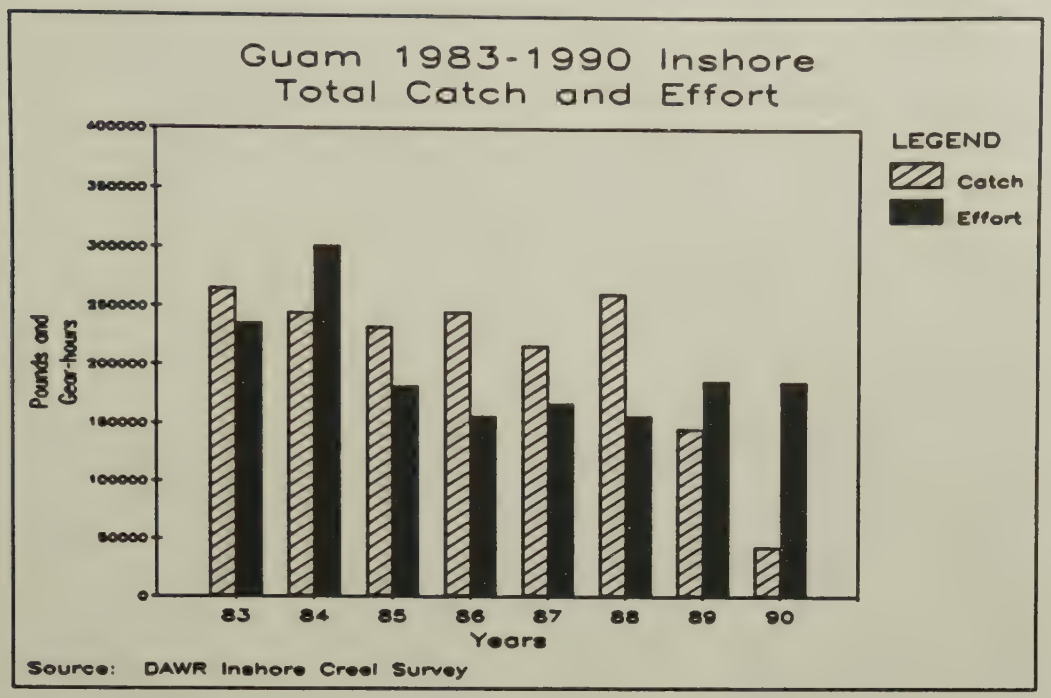
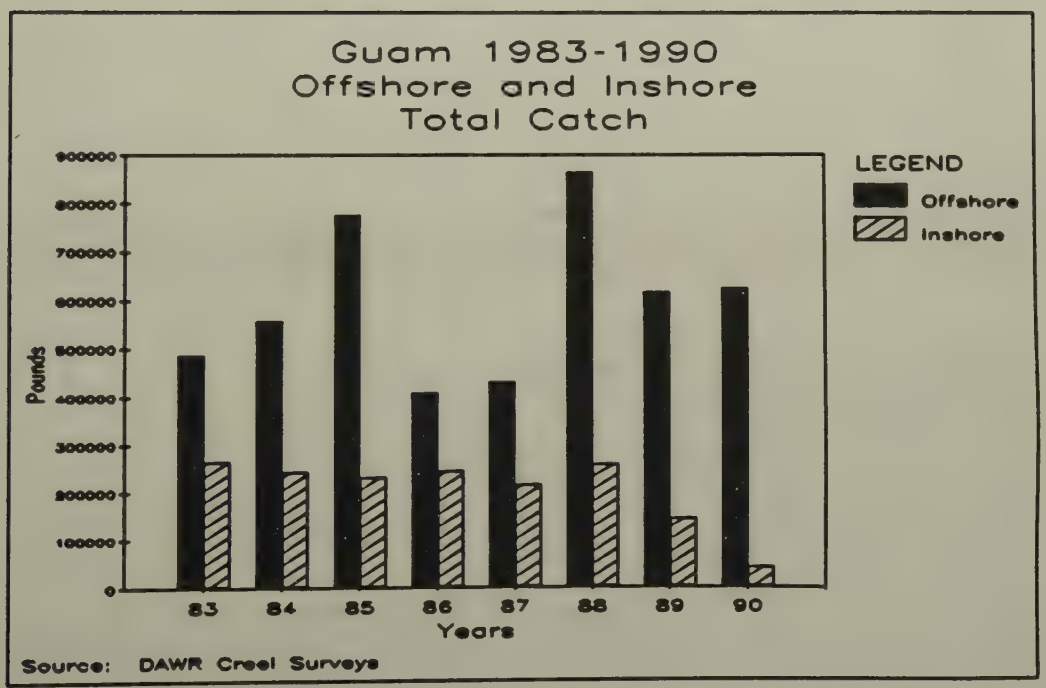


Figure IV.7.2



State of Hawaii

Fishery Statistics 1990

STATE OF HAWAII 1990 FISHERY STATISTICS

Compiled by

Division of Aquatic Resources

and the

Western Pacific Fishery Information Network

May 1992

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STATE OF HAWAII 1990 FISHERY STATISTICS

INTRODUCTION

The Hawaiian Archipelago stretches northwestward over 1,500 miles, from about lat. 19° N and long. 155° W to about lat. 28° N and long. 178° W. The seven main Hawaiian Islands--Hawaii, Maui, Lanai, Molokai, Oahu, Kauai, and Niihau--comprise over 99% of the total land area and have virtually all of the State's population of approximately 1 million residents. Over half of the State's commercial fish catch is landed on Oahu and about a third on Hawaii. The Department of Land and Natural Resources' Division of Aquatic Resources (DAR) has been collecting statistics on the commercial fisheries of Hawaii for over 40 years.

The fisheries of the State of Hawaii are quite diverse and vary from hand harvesting algae to large vessel fisheries, such as longlining and lobster fishing. The major fisheries include tuna fishing using several methods, lobster trapping, hook-and-line bottom fishing for the grouper-snapper-jack complex, net fishing for such species as the bigeye scad, and trolling for such pelagic species as marlin, wahoo, and mahimahi. Of the approximately 15,000 vessels in Hawaii, about 80% are pleasure boats, 10% commercial fishing or charter boats, and the remainder are registered in other categories. The pleasure category includes boats used for recreational, subsistence, and part-time commercial fishing as well as boats not typically used for fishing such as sailboats. To fish commercially (i.e., sell catches or provide charter fishing services) in Hawaii requires purchase of a commercial marine fishing license. There are currently about 2,100 - 2,300 licensed commercial fishermen in the State. Substantial subsistence and recreational fisheries, which are primarily small boat, one-day fisheries, also exist. Data provided in this document are from licensed commercial fishermen only.

DATA COLLECTING SYSTEM

The major data collecting system used by DAR is based on a State law that requires commercial fishermen to report their catches on a monthly basis. Several different data collection forms are used because of the diversity of fishing methods and a desire to obtain specific information on some of these methods. The vast majority of commercial fishermen use the standard C-3 Fish Catch Report, which is submitted each month and requires the following information for each trip taken:

Fisherman's name and commercial license number
Boat's name and its registration number
Date
Area or buoy fished

Type of gear used
Species caught
Number caught
Pounds caught
Pounds sold
Value of sales
Port of landing

The other forms used to report commercial catches are for specific fisheries including the C-4 Aku Catch Report for the pole-and-line or bait-boat fishery for skipjack tuna, the C-5 Flagline Catch Report for the longline fishery for tunas and other pelagic species, and the Pond Operator's Monthly Fish Report for operators of saltwater fish ponds. All of the forms request basic catch and revenue information by species, plus additional fishery-specific information such as effort and bait.

Commercial collectors of tropical marine fish are required to have an aquarium permit in addition to their commercial marine license and are required to report monthly on the C-6 Aquarium Fish Catch Report. However, the aquarium fish catch is not included in the statistics provided in this document.

Some of the advantages of a mandatory fisherman-reporting system are its relative efficiency, low cost, the potential for excellent percent coverage, and the amount of information that can be collected directly from the fishermen. The major disadvantage is that it places the responsibility for accurate data recording and timely data submission on the fishermen. The assumption is made, therefore, that the data submitted by the fishermen are complete and accurate. The DAR recently made several improvements to the system and is continuing its efforts to improve the quality of data and decrease the time delays in receiving and processing the data. No real measurement is available for what percent of the total commercial catch is actually reported to DAR, but estimates have ranged from about 10% to over 99%, depending on the species and fishery. The overall percent coverage was probably over 75% in 1990.

DATA PROCESSING SYSTEM

When the various data reporting forms are received by DAR, they undergo a series of coding and editing procedures before being sent to the State's central data processing staff for keypunching. The use of central data processing staff instead of in-house fisheries personnel to accomplish most of the computer processing activities is a major and significant difference between the processing system in Hawaii and those in American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Forms that fail the initial editing by DAR staff are returned to the fishermen for correction and resubmission. Notices are sent to fishermen who fall more than

a few months behind in the submission of their reports. Once the data are keypunched, computer generated reports are used by DAR staff to verify and correct errors in the database. When the database is considered to be reasonably complete and error free, it is ready for production of a variety of summary catch reports.

Since this system is based on submission of data from fishermen, late reporting has always been a problem. The DAR has tried to include as much information as possible in its published monthly and annual reports. Before about 1982, statistics from fishermen's reports received after the generation of the computerized monthly summary reports were hand tallied and added to the final version of the reports before they were published. However, because of processing restrictions or complications, the original databases were not updated. Since 1982, additional editing and data correction procedures were implemented, making database updates possible. The DAR has made significant progress recently in reducing late reporting by fishermen and the time lag before data are available. Data presented in this report series for 1979-86 were based on published monthly DAR reports and differ from final annual data base totals by some small percent (refer to Volumes I and III for details). Beginning with 1987, data were processed directly from the final annual detailed databases from DAR.

DATA REPORTING SYSTEM

Recorded in DAR's monthly landings reports are more than 150 marine species and species groups, many of which are insignificant in the total catch. To help reduce the volume of this document and improve the usability of the tables, WPACFIN staff combined some of the less important species, reorganized the order of presentation, created a new species coding system, and translated all records in the database. The new coding system has 100 species and species groups based on flexible ecological and phylogenetic criteria. All of the commercially important pelagic and bottom fish species or unique species groups have individual codes and are reported separately. Marine pond catches are included in the species totals, but are less than 0.4% of the total landings for each year.

The monthly and annual reports included in this document contain the common name, weight in pounds, value rounded to the nearest dollar, and the average price per pound for each species. Also included are separate annual reports for commercial fishermen's landings that were not sold. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species combined for the calendar year.

Four graphs of monthly landings are presented for 1990, and 26 trend and seasonality graphs, based on 1979-90 data, are also provided. The following species, species groups, and abbreviations are used in the tables and graphs of Hawaii's fishery statistics:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)	Wahoo
Blue marlin	Black marlin
Striped marlin	Shortbill spearfish
Sailfish	Swordfish
Sharks	

II. Bottomfish Management Unit Species (BMUS)

Deep water jacks (misc.)	Amberjack
Pig-lipped ulua (jack)	White ulua
Giant sea bass	Bluelined snapper
Ehu (red snapper)	Gindai (flower snapper)
Kalikali (pink snapper)	Lehi (silverjaw snapper)
Onaga (long tailed snapper)	Opakapaka (pink snapper)
Uku (gray snapper)	

III. Billfish

Billfish (misc.)	Blue marlin
Black marlin	Striped marlin
Shortbill spearfish	Sailfish
Swordfish	

IV. Tunas

Tunas (misc.)	Skipjack tuna
Yellowfin tuna	Albacore
Bigeye tuna	Kawakawa
Dogtooth tuna	

V. Other Tunas

All of the previous tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:

Rainbow runner	Barracuda
Japanese macker	Frigate tuna
Ocean sunfish	Ocean moonfish

B. Bottom Fish

All BMUS plus the following:

- Blue crevally
- Paapaa ulua
- Porgy
- Dobe ulua (jack)
- Blue spot grouper

C. Reef Fish

- Reef jacks (misc.)
- Trumpetfish
- Mountain bass
- Cardinalfish
- Rudderfish
- Damselfish
- Tilapia
- Parrotfish
- Surgeonfish-tangs
- Triggerfish
- Pufferfish
- Squirrelfish
- Scorpionfish
- Bigeyes
- Goatfish
- Butterflyfish
- Hawkfish
- Wrasse
- Gobies
- Flounders
- Filefish

D. Other

- Miscellaneous
- Eels
- Mackerel scad (opelu)
- Anchovy
- Bonefish
- Milkfish
- Needlefish
- Threadfin
- Pomfret
- Freshwater fish
- Slipper lobster
- Shrimp (freshwater)
- Octopus
- Limpets (saltwater)
- Clams
- Precious corals
- Sea cucumbers
- Algae
- Rays
- Bigeye scad (akule)
- Leatherback
- Ten pounder
- Herring-sardine
- Flyingfish
- Halfbeaks
- Mullet
- Snake mackerel
- Spiny lobster
- Crabs
- Shrimp (saltwater)
- Squid
- Limpets (freshwater)
- Stoney corals
- Sea urchins
- Sea turtles

Table V.1.1

Hawaii 1990 Annual Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	15,872	26,980	1.70
Sharks	100,209	82,868	0.83
Eels	871	607	0.70
Alfonsin	27	51	1.91
Bigeye scad (akule)	624,768	1,106,504	1.77
Mackerel scad	314,862	523,355	1.66
Leatherback	562	569	1.01
Ten pounder	657	638	0.97
Bonefish	7,003	6,415	0.92
Herring/sardine	4	2	0.59
Milkfish	2,275	3,785	1.66
Flying fish	12	15	1.28
Needlefish	235	286	1.22
Halfbeaks	553	1,594	2.88
Threadfin	1,914	9,763	5.10
Mullet	3,608	10,185	2.82
Pomfret	42,936	78,319	1.82
Snake mackerel	29,975	14,058	0.47
Jacks (misc)	66,285	122,586	1.85
Amberjack	4,011	3,129	0.78
Blue crevally	15,181	32,870	2.17
Pig-lipped ulua	84,450	140,233	1.66
Dobe ulua	563	788	1.40
Paapaa ulua	10,096	26,009	2.58
White ulua	20,721	35,895	1.73
Black ulua	752	1,273	1.69
Giant sea bass	74,407	194,433	2.61
Blue spot grouper	483	1,189	2.46
Snappers	2,461	8,856	3.60
Blue lined snapper	43,122	35,489	0.82
Ehu (red snapper)	53,375	200,909	3.76
Gindai (flower snapper)	5,612	16,483	2.94
Kalekale (pink snapper)	23,134	59,125	2.56
Lehi (silverjaw)	20,301	68,946	3.40
Onaga (red snapper)	127,344	710,689	5.58
Opakapaka (pink snapper)	217,174	966,450	4.45
Uku (gray snapper)	167,403	549,487	3.28
Porgy	1,320	3,360	2.55
Reef jacks	53	120	2.26
Squirrelfish	31,883	101,541	3.18
Trumpetfish	63	52	0.82
Scorpionfish	3,147	11,875	3.77
Mountain bass	5,877	12,310	2.09
Bigeyes	3,405	6,281	1.84
Goatfish	51,218	190,162	3.71

Table V.1.1 (Cont.)

Species	Pounds	Value	$/lb
Rudderfish	5,844	5,265	0.90
Damselfish	730	1,025	1.40
Hawkfish	468	764	1.63
Tilapia	13,016	11,045	0.85
Wrasse	10,341	23,269	2.25
Parrotfish	20,443	39,712	1.94
Surgeon/tangs	40,473	47,626	1.18
Flounders	18	18	0.99
Triggerfish	242	226	0.93
Filefish	532	1,060	1.99
Rainbow runner	3,870	5,548	1.43
Mahimahi (dolphin)	777,969	1,627,647	2.09
Barracudas	13,304	17,797	1.34
Wahoo	308,641	849,494	2.75
Tunas	658	972	1.48
Skipjack tuna	1,313,213	2,222,076	1.69
Yellowfin tuna	3,849,686	8,892,296	2.31
Albacore	281,666	443,245	1.57
Bigeye tuna	2,500,925	8,684,870	3.47
Kawakawa	19,996	25,360	1.27
Frigate tuna	359	251	0.70
Billfish	5,023	12,424	2.47
Broadbill swordfish	2,476,520	7,905,698	3.19
Blue marlin	1,138,568	975,633	0.86
Black marlin	35,583	37,137	1.04
Striped marlin	864,624	1,182,684	1.37
Shortnose spearfish	91,862	128,458	1.40
Sailfish	9,139	10,479	1.15
Ocean moonfish	164,692	217,081	1.32
Spiny lobster	268,286	3,678,010	13.71
Slipper lobster	48,305	465,573	9.64
Crabs	43,265	203,703	4.71
Shrimp (freshwater)	272	1,416	5.21
Shrimp (saltwater)	191,283	891,339	4.66
Octopus	9,854	23,940	2.43
Squid	24,367	29,658	1.22
Limpets (saltwater)	5,700	17,961	3.15
Limpets (freshwater)	33	81	2.47
Precious corals	2,169	31,575	14.56
Sea cucumbers	90	549	6.10
Algae	5,916	18,482	3.12
** TOTAL **	16,728,129	44,097,981	2.64

Table V.1.2

Hawaii 1990 Annual Commercial Landings (not sold)

Species	Pounds
Miscellaneous	844
Sharks	11,675
Eels	36
Bigeye scad (akule)	57,474
Mackerel scad	5,312
Leatherback	65
Ten pounder	53
Bonefish	2,282
Herring/sardine	2
Milkfish	27
Needlefish	19
Threadfin	288
Mullet	350
Pomfret	64
Snake mackerel	565
Jacks (misc)	10,781
Amberjack	16,381
Blue crevally	583
Pig-lipped ulua	200
Paapaa ulua	68
White ulua	818
Black ulua	4
Giant sea bass	380
Blue spot grouper	69
Snappers	51
Blue lined snapper	9,183
Ehu (red snapper)	2,066
Gindai (flower snapper)	382
Kalekale (pink snapper)	1,752
Lehi (silverjaw)	1,525
Onaga (red snapper)	3,162
Opakapaka (pink snapper)	5,705
Uku (gray snapper)	3,102
Porgy	191
Reef jacks	2
Squirrelfish	1,880
Trumpetfish	8
Scorpionfish	325
Mountain bass	607
Bigeyes	690
Cardinalfish	111
Goatfish	6,657
Rudderfish	918
Damselfish	26
Hawkfish	51

Table V.1.2 (Cont.)

Species	Pounds
Tilapia	883
Wrasse	1,680
Parrotfish	1,419
Surgeon/tangs	8,572
Triggerfish	617
Filefish	183
Rainbow runner	403
Mahimahi (dolphin)	46,212
Barracudas	1,805
Wahoo	26,209
Tunas	245
Skipjack tuna	67,934
Yellowfin tuna	157,086
Albacore	810
Bigeye tuna	40,166
Kawakawa	7,540
Frigate tuna	52
Billfish	8,600
Broadbill swordfish	32,290
Blue marlin	63,870
Black marlin	2,918
Striped marlin	10,940
Shortnose spearfish	3,344
Sailfish	266
Ocean moonfish	3
Spiny lobster	3,057
Slipper lobster	3,268
Crabs	2,027
Shrimp (freshwater)	10
Shrimp (saltwater)	133
Octopus	3,546
Squid	1,599
Limpets (saltwater)	736
Precious corals	180
Sea urchins	117
Algae	2,501
** TOTAL **	647,955

Table V.1.3

Hawaii January 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	607	1,255	2.07
Sharks	8,470	7,897	0.93
Bigeye scad (akule)	20,857	43,355	2.08
Mackerel scad	22,296	37,632	1.69
Leatherback	18	18	1.02
Ten pounder	15	15	0.97
Bonefish	211	177	0.84
Milkfish	230	364	1.58
Flying fish	4	6	1.50
Needlefish	3	5	1.63
Halfbeaks	69	209	3.02
Threadfin	128	663	5.18
Mullet	444	1,558	3.51
Pomfret	2,828	6,817	2.41
Snake mackerel	3,954	1,726	0.44
Jacks (misc)	2,695	4,647	1.72
Amberjack	567	440	0.78
Blue crevally	70	235	3.36
Pig-lipped ulua	2,988	6,992	2.34
Dobe ulua	4	9	2.19
Paapaa ulua	149	478	3.21
White ulua	169	551	3.26
Giant sea bass	1,604	6,463	4.03
Blue spot grouper	10	27	2.65
Snappers	31	99	3.20
Blue lined snapper	980	1,075	1.10
Ehu (red snapper)	1,789	8,583	4.80
Gindai (flower snapper)	124	477	3.85
Kalekale (pink snapper)	589	1,855	3.15
Lehi (silverjaw)	1,467	5,867	4.00
Onaga (red snapper)	11,184	69,028	6.17
Opakapaka (pink snapper)	12,592	72,579	5.76
Uku (gray snapper)	3,371	16,915	5.02
Porgy	35	76	2.16
Squirrelfish	411	980	2.38
Scorpionfish	127	576	4.53
Mountain bass	630	890	1.41
Bigeyes	62	111	1.79
Goatfish	2,474	10,850	4.39
Rudderfish	148	165	1.11
Hawkfish	11	14	1.24
Tilapia	112	381	3.40

Table V.1.3 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	267	710	2.66
Parrotfish	915	1,543	1.69
Surgeon/tangs	1,675	2,152	1.28
Flounders	8	8	1.00
Triggerfish	30	6	0.19
Filefish	96	211	2.20
Rainbow runner	101	172	1.70
Mahimahi (dolphin)	30,330	93,300	3.08
Barracudas	166	350	2.11
Wahoo	6,287	25,564	4.07
Skipjack tuna	164,438	284,213	1.73
Yellowfin tuna	161,431	422,110	2.61
Albacore	5,800	11,955	2.06
Bigeye tuna	208,158	700,297	3.36
Kawakawa	401	608	1.52
Broadbill swordfish	127,762	588,449	4.61
Blue marlin	57,184	59,650	1.04
Black marlin	1,355	1,110	0.82
Striped marlin	92,336	139,893	1.52
Shortnose spearfish	8,563	12,780	1.49
Ocean moonfish	11,869	16,227	1.37
Spiny lobster	6,564	46,223	7.04
Slipper lobster	1,429	10,049	7.03
Crabs	2,211	11,516	5.21
Shrimp (saltwater)	37,640	178,790	4.75
Octopus	413	1,019	2.47
Squid	148	356	2.40
Limpets (saltwater)	335	1,118	3.34
Limpets (freshwater)	28	70	2.50
Algae	260	700	2.69
** SUBTOTAL **	1,032,727	2,923,205	2.83

Table V.1.4

Hawaii February 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	692	1,560	2.25
Sharks	6,613	8,996	1.36
Eels	42	16	0.39
Bigeye scad (akule)	46,301	90,522	1.96
Mackerel scad	15,415	27,330	1.77
Ten pounder	19	34	1.79
Bonefish	1,491	1,775	1.19
Herring/sardine	3	2	0.75
Milkfish	27	17	0.64
Needlefish	26	45	1.73
Halfbeaks	150	419	2.79
Threadfin	138	808	5.85
Mullet	74	256	3.46
Pomfret	2,950	8,430	2.86
Snake mackerel	1,765	1,801	1.02
Jacks (misc)	4,689	8,556	1.82
Amberjack	976	744	0.76
Blue crevally	366	1,516	4.14
Pig-lipped ulua	4,395	12,933	2.94
Dobe ulua	79	174	2.21
Paapaa ulua	831	3,742	4.50
White ulua	629	1,797	2.86
Giant sea bass	4,336	13,104	3.02
Blue spot grouper	33	72	2.18
Snappers	53	164	3.10
Blue lined snapper	2,739	2,812	1.03
Ehu (red snapper)	4,628	18,545	4.01
Gindai (flower snapper)	455	1,678	3.69
Kalekale (pink snapper)	1,404	4,184	2.98
Lehi (silverjaw)	2,517	11,324	4.50
Onaga (red snapper)	10,565	72,003	6.82
Opakapaka (pink snapper)	23,171	117,962	5.09
Uku (gray snapper)	8,716	35,920	4.12
Porgy	40	126	3.14
Squirrelfish	1,390	3,827	2.75
Trumpetfish	6	3	0.52
Scorpionfish	206	925	4.49
Mountain bass	1,112	1,874	1.68
Bigeyes	253	546	2.16
Goatfish	5,519	21,323	3.86
Rudderfish	267	256	0.96
Damselfish	15	25	1.68

Table V.1.4 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	22	85	3.87
Tilapia	220	264	1.20
Wrasse	809	1,803	2.23
Parrotfish	1,153	2,268	1.97
Surgeon/tangs	1,631	2,258	1.38
Triggerfish	2	0	0.08
Filefish	112	169	1.51
Rainbow runner	231	484	2.10
Mahimahi (dolphin)	30,584	95,051	3.11
Barracudas	466	753	1.62
Wahoo	7,964	38,248	4.80
Tunas	67	34	0.50
Skipjack tuna	76,632	165,193	2.16
Yellowfin tuna	175,756	477,860	2.72
Albacore	2,654	7,026	2.65
Bigeye tuna	165,334	590,647	3.57
Kawakawa	1,779	1,516	0.85
Broadbill swordfish	117,843	520,102	4.41
Blue marlin	40,628	46,379	1.14
Black marlin	862	355	0.41
Striped marlin	71,524	124,258	1.74
Shortnose spearfish	9,622	18,760	1.95
Ocean moonfish	8,728	15,987	1.83
Spiny lobster	333	2,822	8.47
Slipper lobster	56	476	8.50
Crabs	1,972	11,293	5.73
Shrimp (saltwater)	1,698	8,236	4.85
Octopus	106	269	2.54
Squid	62	143	2.31
Limpets (saltwater)	373	1,112	2.98
Algae	166	475	2.86
** SUBTOTAL **	874,485	2,612,473	2.99

Table V.1.5

Hawaii March 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	873	2,034	2.33
Sharks	9,610	11,276	1.17
Eels	19	10	0.50
Bigeye scad (akule)	76,174	143,141	1.88
Mackerel scad	18,653	35,015	1.88
Leatherback	11	11	0.97
Ten pounder	79	59	0.74
Bonefish	1,452	600	0.41
Milkfish	97	158	1.63
Needlefish	34	67	1.98
Halfbeaks	51	155	3.04
Threadfin	217	1,132	5.22
Mullet	885	2,448	2.77
Pomfret	7,277	13,613	1.87
Snake mackerel	1,819	2,176	1.20
Jacks (misc)	4,491	8,846	1.97
Amberjack	344	458	1.33
Blue crevally	533	2,234	4.19
Pig-lipped ulua	7,187	11,298	1.57
Dobe ulua	6	14	2.33
Paapaa ulua	911	3,848	4.22
White ulua	951	2,662	2.80
Giant sea bass	3,617	12,942	3.58
Blue spot grouper	6	12	1.96
Snappers	71	232	3.27
Blue lined snapper	5,334	5,084	0.95
Ehu (red snapper)	4,392	19,238	4.38
Gindai (flower snapper)	426	1,467	3.44
Kalekale (pink snapper)	2,164	5,513	2.55
Lehi (silverjaw)	2,218	8,602	3.88
Onaga (red snapper)	7,651	47,296	6.18
Opakapaka (pink snapper)	23,398	104,482	4.47
Uku (gray snapper)	6,719	26,732	3.98
Porgy	170	408	2.40
Reef jacks	2	5	2.25
Squirrelfish	3,662	13,940	3.81
Trumpetfish	8	9	1.11
Scorpionfish	248	946	3.81
Mountain bass	624	1,296	2.08
Bigeyes	262	565	2.16
Goatfish	4,509	15,924	3.53
Rudderfish	347	362	1.04

Table V.1.5 (Cont.)

Species	Pounds	Value	$/lb
Damselfish	15	20	1.33
Hawkfish	39	58	1.49
Tilapia	785	752	0.96
Wrasse	652	1,666	2.56
Parrotfish	1,793	3,375	1.88
Surgeon/tangs	3,244	5,245	1.62
Triggerfish	10	2	0.22
Filefish	128	242	1.89
Rainbow runner	209	454	2.17
Mahimahi (dolphin)	61,773	146,980	2.38
Barracudas	697	978	1.40
Wahoo	15,186	63,346	4.17
Tunas	13	17	1.31
Skipjack tuna	72,890	180,137	2.47
Yellowfin tuna	154,168	431,915	2.80
Albacore	7,141	17,625	2.47
Bigeye tuna	190,745	843,151	4.42
Kawakawa	4,525	6,283	1.39
Broadbill swordfish	136,854	511,043	3.73
Blue marlin	64,026	81,486	1.27
Black marlin	321	161	0.50
Striped marlin	61,844	122,774	1.99
Shortnose spearfish	8,837	16,176	1.83
Ocean moonfish	15,951	25,802	1.62
Spiny lobster	7,629	81,999	10.75
Slipper lobster	1,142	9,826	8.60
Crabs	4,342	17,010	3.92
Shrimp (freshwater)	112	596	5.32
Shrimp (saltwater)	41,149	195,220	4.74
Octopus	175	426	2.43
Squid	16	56	3.50
Limpets (saltwater)	253	1,145	4.53
Algae	217	782	3.60
** SUBTOTAL **	1,054,383	3,273,058	3.10

Table V.1.6

Hawaii April 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,259	2,257	1.79
Sharks	7,326	6,695	0.91
Eels	128	70	0.54
Bigeye scad (akule)	64,166	102,374	1.60
Mackerel scad	20,216	36,666	1.81
Leatherback	12	12	1.00
Ten pounder	163	163	1.00
Bonefish	969	681	0.70
Milkfish	200	327	1.64
Flying fish	2	3	1.58
Threadfin	416	1,996	4.80
Mullet	185	519	2.81
Pomfret	4,016	6,005	1.50
Snake mackerel	3,645	3,641	1.00
Jacks (misc)	7,745	13,634	1.76
Amberjack	549	220	0.40
Blue crevally	168	499	2.97
Pig-lipped ulua	4,938	6,299	1.28
Dobe ulua	23	34	1.46
Paapaa ulua	264	862	3.26
White ulua	239	589	2.46
Black ulua	14	23	1.64
Giant sea bass	4,760	12,929	2.72
Blue spot grouper	24	41	1.72
Snappers	251	1,155	4.60
Blue lined snapper	3,307	2,887	0.87
Ehu (red snapper)	3,138	11,773	3.75
Gindai (flower snapper)	380	1,125	2.96
Kalekale (pink snapper)	1,507	4,350	2.89
Lehi (silverjaw)	1,594	5,488	3.44
Onaga (red snapper)	9,905	57,188	5.77
Opakapaka (pink snapper)	17,367	78,505	4.52
Uku (gray snapper)	13,036	43,008	3.30
Porgy	135	427	3.16
Reef jacks	32	58	1.82
Squirrelfish	3,310	10,511	3.18
Scorpionfish	219	768	3.51
Mountain bass	391	773	1.98
Bigeyes	479	975	2.04
Goatfish	3,784	14,414	3.81
Rudderfish	481	446	0.93
Damselfish	21	20	0.96

Table V.1.6 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	126	113	0.90
Tilapia	813	730	0.90
Wrasse	891	2,101	2.36
Parrotfish	1,808	3,219	1.78
Surgeon/tangs	2,210	2,667	1.21
Triggerfish	36	33	0.92
Filefish	35	77	2.21
Rainbow runner	271	415	1.53
Mahimahi (dolphin)	95,172	176,692	1.86
Barracudas	758	1,173	1.55
Wahoo	37,610	98,783	2.63
Tunas	74	95	1.28
Skipjack tuna	153,273	273,981	1.79
Yellowfin tuna	324,788	629,441	1.94
Albacore	7,140	10,857	1.52
Bigeye tuna	213,600	615,938	2.88
Kawakawa	2,952	4,048	1.37
Frigate tuna	2	3	1.50
Broadbill swordfish	267,452	641,300	2.40
Blue marlin	97,906	84,819	0.87
Black marlin	6,345	4,792	0.76
Striped marlin	79,817	115,610	1.45
Shortnose spearfish	10,179	11,992	1.18
Ocean moonfish	12,695	15,396	1.21
Spiny lobster	37,866	440,197	11.63
Slipper lobster	3,180	25,934	8.16
Crabs	4,502	25,611	5.69
Shrimp (freshwater)	43	235	5.47
Shrimp (saltwater)	25,544	116,111	4.55
Octopus	371	947	2.55
Squid	373	1,019	2.73
Limpets (saltwater)	398	1,514	3.80
Algae	755	2,846	3.77
** SUBTOTAL **	1,569,749	3,739,099	2.38

Table V.1.7

Hawaii May 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,019	2,251	2.21
Sharks	7,525	6,788	0.90
Eels	33	17	0.50
Alfonsin	21	38	1.82
Bigeye scad (akule)	40,936	69,214	1.69
Mackerel scad	19,892	32,705	1.64
Leatherback	4	3	0.69
Ten pounder	75	71	0.94
Bonefish	454	513	1.13
Milkfish	419	536	1.28
Flying fish	3	5	1.50
Needlefish	60	9	0.15
Threadfin	215	1,103	5.13
Mullet	116	342	2.95
Pomfret	4,162	6,693	1.61
Snake mackerel	3,680	1,607	0.44
Jacks (misc)	5,036	10,023	1.99
Amberjack	17	5	0.30
Blue crevally	2,164	6,383	2.95
Pig-lipped ulua	5,084	9,201	1.81
Dobe ulua	5	6	1.10
Paapaa ulua	1,196	2,858	2.39
White ulua	1,016	1,788	1.76
Black ulua	68	136	2.00
Giant sea bass	8,062	20,319	2.52
Blue spot grouper	19	41	2.18
Snappers	183	857	4.68
Blue lined snapper	2,809	2,425	0.86
Ehu (red snapper)	2,466	11,911	4.83
Gindai (flower snapper)	241	842	3.49
Kalekale (pink snapper)	1,142	3,294	2.88
Lehi (silverjaw)	297	1,253	4.22
Onaga (red snapper)	5,664	34,405	6.07
Opakapaka (pink snapper)	11,146	51,655	4.63
Uku (gray snapper)	10,252	41,685	4.07
Porgy	32	92	2.88
Reef jacks	12	36	3.00
Squirrelfish	1,711	6,126	3.58
Trumpetfish	6	3	0.52
Scorpionfish	134	508	3.79
Mountain bass	384	763	1.99
Bigeyes	89	160	1.80

Table V.1.7 (Cont.)

Species	Pounds	Value	$/lb
Goatfish	2,279	9,330	4.09
Rudderfish	500	472	0.94
Damselfish	113	117	1.03
Hawkfish	8	11	1.31
Tilapia	992	852	0.86
Wrasse	368	449	1.22
Parrotfish	1,217	2,439	2.00
Surgeon/tangs	2,820	3,348	1.19
Filefish	43	85	1.99
Rainbow runner	188	242	1.29
Mahimahi (dolphin)	71,502	151,537	2.12
Barracudas	1,838	1,982	1.08
Wahoo	37,711	93,271	2.47
Tunas	13	5	0.35
Skipjack tuna	66,377	146,262	2.20
Yellowfin tuna	339,798	699,325	2.06
Albacore	44,942	61,349	1.37
Bigeye tuna	153,104	543,281	3.55
Kawakawa	1,437	1,952	1.36
Frigate tuna	20	17	0.87
Billfish	4,507	11,348	2.52
Broadbill swordfish	535,316	1,521,211	2.84
Blue marlin	100,698	70,843	0.70
Black marlin	3,727	2,076	0.56
Striped marlin	126,659	144,200	1.14
Shortnose spearfish	10,956	10,915	1.00
Sailfish	93	37	0.40
Ocean moonfish	16,126	20,016	1.24
Spiny lobster	28,048	369,506	13.17
Slipper lobster	5,962	60,689	10.18
Crabs	4,987	25,901	5.19
Shrimp (freshwater)	23	110	4.78
Shrimp (saltwater)	15,799	71,492	4.53
Octopus	213	484	2.27
Squid	312	841	2.69
Limpets (saltwater)	556	1,635	2.94
Algae	446	2,050	4.60
** SUBTOTAL **	1,717,547	4,358,349	2.54

Table V.1.8

Hawaii June 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,474	2,149	1.46
Sharks	5,360	4,207	0.78
Eels	12	7	0.60
Bigeye scad (akule)	68,286	130,221	1.91
Mackerel scad	24,962	40,932	1.64
Leatherback	53	57	1.07
Ten pounder	16	16	0.98
Bonefish	71	90	1.27
Milkfish	269	383	1.42
Threadfin	62	310	5.00
Mullet	151	499	3.30
Pomfret	3,012	4,844	1.61
Snake mackerel	1,582	287	0.18
Jacks (misc)	4,232	8,622	2.04
Amberjack	85	109	1.28
Blue crevally	4,572	7,925	1.73
Pig-lipped ulua	6,061	8,105	1.34
Dobe ulua	14	27	1.90
Paapaa ulua	704	1,915	2.72
White ulua	2,432	4,262	1.75
Black ulua	8	8	1.00
Giant sea bass	6,849	17,364	2.54
Blue spot grouper	139	306	2.20
Snappers	110	533	4.85
Blue lined snapper	1,777	1,629	0.92
Ehu (red snapper)	3,764	13,185	3.50
Gindai (flower snapper)	396	1,174	2.96
Kalekale (pink snapper)	1,617	4,339	2.68
Lehi (silverjaw)	324	903	2.79
Onaga (red snapper)	4,077	26,190	6.42
Opakapaka (pink snapper)	7,277	37,324	5.13
Uku (gray snapper)	22,593	84,547	3.74
Porgy	68	195	2.87
Reef jacks	7	21	3.00
Squirrelfish	1,079	3,978	3.69
Trumpetfish	8	7	0.83
Scorpionfish	241	1,041	4.32
Mountain bass	497	966	1.94
Bigeyes	103	204	1.98
Goatfish	2,795	16,837	6.02
Rudderfish	721	697	0.97
Damselfish	64	111	1.74

Table V.1.8 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	14	26	1.88
Tilapia	868	687	0.79
Wrasse	809	1,305	1.61
Parrotfish	1,222	2,394	1.96
Surgeon/tangs	1,836	2,238	1.22
Triggerfish	30	54	1.79
Filefish	6	12	1.94
Rainbow runner	285	391	1.37
Mahimahi (dolphin)	29,443	80,371	2.73
Barracudas	1,828	1,552	0.85
Wahoo	48,696	111,334	2.29
Skipjack tuna	197,149	294,142	1.49
Yellowfin tuna	374,796	774,345	2.07
Albacore	46,439	59,041	1.27
Bigeye tuna	105,704	277,565	2.63
Kawakawa	1,094	1,676	1.53
Frigate tuna	4	4	1.00
Billfish	219	400	1.83
Broadbill swordfish	532,539	1,444,517	2.71
Blue marlin	88,673	61,577	0.69
Black marlin	11,140	14,668	1.32
Striped marlin	118,578	103,641	0.87
Shortnose spearfish	7,449	7,089	0.95
Sailfish	239	169	0.71
Ocean moonfish	7,526	9,544	1.27
Spiny lobster	44,260	670,687	15.15
Slipper lobster	10,659	109,925	10.31
Crabs	221	1,000	4.52
Shrimp (saltwater)	7,840	37,240	4.75
Octopus	523	1,348	2.58
Squid	1,556	4,220	2.71
Limpets (saltwater)	219	778	3.55
Algae	566	2,229	3.94
** SUBTOTAL **	1,820,354	4,502,697	2.47

Table V.1.9

Hawaii July 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,110	1,077	0.97
Sharks	3,519	2,482	0.71
Eels	408	325	0.80
Alfonsin	6	13	2.20
Bigeye scad (akule)	84,124	131,435	1.56
Mackerel scad	30,633	49,588	1.62
Leatherback	29	31	1.07
Bonefish	577	653	1.13
Milkfish	23	35	1.50
Mullet	151	483	3.20
Pomfret	1,541	2,841	1.84
Snake mackerel	691	278	0.40
Jacks (misc)	7,518	13,103	1.74
Amberjack	329	165	0.50
Blue crevally	2,179	3,599	1.65
Pig-lipped ulua	2,414	4,405	1.82
Dobe ulua	4	4	1.00
Paapaa ulua	770	1,744	2.27
White ulua	2,305	4,516	1.96
Black ulua	10	26	2.60
Giant sea bass	2,362	6,927	2.93
Blue spot grouper	38	103	2.71
Snappers	102	429	4.21
Blue lined snapper	3,039	2,081	0.68
Ehu (red snapper)	3,121	11,453	3.67
Gindai (flower snapper)	381	1,160	3.05
Kalekale (pink snapper)	2,619	6,638	2.53
Lehi (silverjaw)	1,280	3,736	2.92
Onaga (red snapper)	7,070	39,560	5.60
Opakapaka (pink snapper)	15,980	62,595	3.92
Uku (gray snapper)	29,582	79,910	2.70
Porgy	108	358	3.31
Squirrelfish	3,179	9,850	3.10
Trumpetfish	3	3	1.00
Scorpionfish	449	1,778	3.96
Mountain bass	338	679	2.01
Bigeyes	198	232	1.17
Goatfish	5,061	22,631	4.47
Rudderfish	1,276	648	0.51
Damselfish	107	179	1.67
Hawkfish	68	121	1.78
Tilapia	1,848	1,529	0.83

Table V.1.9 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	1,585	4,121	2.60
Parrotfish	2,667	5,399	2.02
Surgeon/tangs	4,964	5,196	1.05
Flounders	8	8	0.97
Triggerfish	36	47	1.31
Filefish	20	42	2.12
Rainbow runner	495	579	1.17
Mahimahi (dolphin)	31,774	81,759	2.57
Barracudas	1,760	2,482	1.41
Wahoo	55,720	117,395	2.11
Skipjack tuna	121,428	160,480	1.32
Yellowfin tuna	736,937	1,317,655	1.79
Albacore	31,557	37,207	1.18
Bigeye tuna	78,959	198,722	2.52
Kawakawa	1,153	1,219	1.06
Frigate tuna	221	110	0.50
Billfish	191	417	2.18
Broadbill swordfish	419,639	1,572,778	3.75
Blue marlin	155,168	91,275	0.59
Black marlin	7,827	9,992	1.28
Striped marlin	44,066	50,780	1.15
Shortnose spearfish	4,342	6,494	1.50
Sailfish	822	646	0.79
Ocean moonfish	7,315	11,421	1.56
Spiny lobster	38,735	588,092	15.18
Slipper lobster	5,117	52,644	10.29
Crabs	1,407	5,452	3.87
Shrimp (saltwater)	3,860	18,335	4.75
Octopus	1,498	3,277	2.19
Squid	1,267	2,861	2.26
Limpets (saltwater)	648	1,981	3.06
Algae	884	3,023	3.42
** SUBTOTAL **	1,978,620	4,821,293	2.44

Table V.1.10

Hawaii August 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	773	790	1.02
Sharks	9,403	7,276	0.77
Eels	66	45	0.68
Bigeye scad (akule)	57,651	100,133	1.74
Mackerel scad	41,628	67,313	1.62
Leatherback	4	4	1.09
Bonefish	52	51	0.98
Milkfish	5	7	1.43
Flying fish	1	0	0.25
Needlefish	102	147	1.44
Mullet	302	758	2.51
Pomfret	461	863	1.87
Snake mackerel	1,063	230	0.22
Jacks (misc)	7,516	14,741	1.96
Amberjack	114	111	0.97
Blue crevally	2,248	4,779	2.13
Pig-lipped ulua	12,347	21,649	1.75
Dobe ulua	28	43	1.52
Paapaa ulua	1,308	2,552	1.95
White ulua	4,874	6,514	1.34
Black ulua	71	140	1.98
Giant sea bass	15,026	35,396	2.36
Blue spot grouper	81	221	2.73
Snappers	215	840	3.91
Blue lined snapper	4,555	3,607	0.79
Ehu (red snapper)	4,939	16,438	3.33
Gindai (flower snapper)	860	2,389	2.78
Kalekale (pink snapper)	2,993	7,432	2.48
Lehi (silverjaw)	1,520	4,515	2.97
Onaga (red snapper)	9,774	53,381	5.46
Opakapaka (pink snapper)	19,631	86,310	4.40
Uku (gray snapper)	24,373	73,488	3.02
Porgy	117	284	2.43
Squirrelfish	4,148	13,510	3.26
Trumpetfish	19	19	0.98
Scorpionfish	181	504	2.78
Mountain bass	213	485	2.28
Bigeyes	248	424	1.71
Goatfish	5,463	20,097	3.68
Rudderfish	318	300	0.94
Damselfish	120	233	1.94
Hawkfish	35	50	1.42

Table V.1.10 (Cont.)

Species	Pounds	Value	$/lb
Tilapia	1,933	1,573	0.81
Wrasse	1,053	2,338	2.22
Parrotfish	1,348	2,631	1.95
Surgeon/tangs	4,314	4,891	1.13
Triggerfish	5	31	6.24
Filefish	9	23	2.57
Rainbow runner	758	1,032	1.36
Mahimahi (dolphin)	36,222	105,736	2.92
Barracudas	1,954	2,397	1.23
Wahoo	35,476	98,489	2.78
Tunas	209	157	0.75
Skipjack tuna	240,581	290,868	1.21
Yellowfin tuna	606,689	1,532,272	2.53
Albacore	30,163	49,521	1.64
Bigeye tuna	65,846	242,080	3.68
Kawakawa	1,372	1,605	1.17
Billfish	106	260	2.45
Broadbill swordfish	109,746	389,554	3.55
Blue marlin	172,877	126,733	0.73
Black marlin	2,316	1,301	0.56
Striped marlin	18,908	29,118	1.54
Shortnose spearfish	2,964	4,832	1.63
Sailfish	602	752	1.25
Ocean moonfish	5,119	8,514	1.66
Spiny lobster	36,286	525,988	14.50
Slipper lobster	6,996	66,935	9.57
Crabs	3,025	11,107	3.67
Shrimp (freshwater)	21	105	5.00
Octopus	1,490	3,689	2.48
Squid	1,297	3,109	2.40
Limpets (saltwater)	1,023	3,149	3.08
Precious corals	655	9,000	13.74
Algae	891	2,218	2.49
** SUBTOTAL **	1,627,100	4,070,075	2.50

Table V.1.11

Hawaii September 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,424	2,722	1.91
Sharks	8,051	6,897	0.86
Eels	63	40	0.63
Bigeye scad (akule)	41,986	75,273	1.79
Mackerel scad	42,774	66,555	1.56
Leatherback	222	222	1.00
Ten pounder	49	48	0.97
Bonefish	246	280	1.14
Milkfish	249	454	1.82
Flying fish	2	2	0.75
Needlefish	9	12	1.34
Halfbeaks	73	200	2.74
Threadfin	390	1,941	4.98
Mullet	79	248	3.14
Pomfret	2,533	4,722	1.86
Snake mackerel	1,711	192	0.11
Jacks (misc)	5,927	10,272	1.73
Amberjack	98	102	1.04
Blue crevally	1,181	2,160	1.83
Pig-lipped ulua	17,325	23,481	1.36
Dobe ulua	333	412	1.24
Paapaa ulua	1,499	2,246	1.50
White ulua	2,651	3,276	1.24
Black ulua	165	250	1.51
Giant sea bass	13,813	32,280	2.34
Blue spot grouper	65	176	2.71
Snappers	110	466	4.24
Blue lined snapper	5,080	3,986	0.78
Ehu (red snapper)	9,154	23,397	2.56
Gindai (flower snapper)	1,167	2,754	2.36
Kalekale (pink snapper)	2,841	5,476	1.93
Lehi (silverjaw)	2,621	7,539	2.88
Onaga (red snapper)	12,961	58,840	4.54
Opakapaka (pink snapper)	24,918	93,809	3.76
Uku (gray snapper)	14,527	35,429	2.44
Porgy	194	384	1.98
Squirrelfish	4,267	11,599	2.72
Scorpionfish	403	1,378	3.42
Mountain bass	579	1,138	1.97
Bigeyes	322	534	1.66
Goatfish	4,139	14,947	3.61
Rudderfish	407	504	1.24

Table V.1.11 (Cont.)

Species	Pounds	Value	$/lb
Damselfish	16	20	1.24
Hawkfish	28	43	1.55
Tilapia	1,503	1,179	0.78
Wrasse	1,258	2,531	2.01
Parrotfish	2,280	4,106	1.80
Surgeon/tangs	4,290	4,867	1.13
Triggerfish	39	9	0.22
Filefish	33	59	1.79
Rainbow runner	762	1,009	1.32
Mahimahi (dolphin)	57,545	134,285	2.33
Barracudas	1,149	2,106	1.83
Wahoo	22,463	68,703	3.06
Tunas	140	330	2.36
Skipjack tuna	42,578	76,035	1.79
Yellowfin tuna	332,509	934,522	2.81
Albacore	24,075	39,849	1.66
Bigeye tuna	116,124	407,503	3.51
Kawakawa	2,242	2,773	1.24
Broadbill swordfish	70,366	199,336	2.83
Blue marlin	147,180	123,349	0.84
Black marlin	283	275	0.97
Striped marlin	13,457	21,920	1.63
Shortnose spearfish	4,701	7,096	1.51
Sailfish	1,257	1,421	1.13
Ocean moonfish	10,031	16,600	1.65
Spiny lobster	26,763	350,444	13.09
Slipper lobster	4,428	38,457	8.69
Crabs	5,614	25,632	4.57
Shrimp (freshwater)	35	175	5.00
Shrimp (saltwater)	15,000	71,250	4.75
Octopus	1,475	3,508	2.38
Squid	6,911	6,769	0.98
Limpets (saltwater)	391	1,157	2.96
Precious corals	1,114	16,575	14.88
Sea cucumbers	14	98	7.00
Algae	825	1,724	2.09
** SUBTOTAL **	1,145,487	3,062,354	2.67

Table V.1.12

Hawaii October 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,831	3,671	2.00
Sharks	9,802	7,172	0.73
Eels	32	17	0.53
Bigeye scad (akule)	54,803	93,263	1.70
Mackerel scad	35,497	57,707	1.63
Leatherback	3	3	0.83
Ten pounder	59	55	0.93
Bonefish	379	436	1.15
Milkfish	136	183	1.34
Needlefish	1	1	1.00
Halfbeaks	199	590	2.97
Threadfin	132	692	5.24
Mullet	549	1,348	2.46
Pomfret	3,305	5,927	1.79
Snake mackerel	2,286	358	0.16
Jacks (misc)	5,299	9,468	1.79
Amberjack	116	102	0.88
Blue crevally	913	1,584	1.73
Pig-lipped ulua	9,658	12,547	1.30
Dobe ulua	26	24	0.91
Paapaa ulua	1,062	1,620	1.53
White ulua	1,133	1,813	1.60
Black ulua	210	306	1.46
Giant sea bass	4,490	10,760	2.40
Blue spot grouper	31	94	3.03
Snappers	236	1,052	4.46
Blue lined snapper	4,985	3,979	0.80
Ehu (red snapper)	4,722	14,513	3.07
Gindai (flower snapper)	338	912	2.70
Kalekale (pink snapper)	2,103	5,234	2.49
Lehi (silverjaw)	3,336	9,840	2.95
Onaga (red snapper)	12,089	53,164	4.40
Opakapaka (pink snapper)	21,530	76,481	3.55
Uku (gray snapper)	13,356	34,548	2.59
Porgy	103	338	3.28
Squirrelfish	3,560	10,752	3.02
Trumpetfish	3	2	0.50
Scorpionfish	290	989	3.41
Mountain bass	445	1,161	2.61
Bigeyes	392	589	1.50
Goatfish	4,604	13,843	3.01
Rudderfish	949	940	0.99

Table V.1.12 (Cont.)

Species	Pounds	Value	$/lb
Damselfish	69	55	0.80
Hawkfish	37	69	1.86
Tilapia	1,358	1,039	0.76
Wrasse	1,169	2,783	2.38
Parrotfish	2,844	5,720	2.01
Surgeon/tangs	3,147	3,538	1.12
Triggerfish	17	5	0.28
Filefish	13	15	1.13
Rainbow runner	178	235	1.32
Mahimahi (dolphin)	116,763	217,018	1.86
Barracudas	1,349	1,890	1.40
Wahoo	21,080	67,421	3.20
Tunas	10	12	1.15
Skipjack tuna	60,048	117,910	1.96
Yellowfin tuna	227,504	603,183	2.65
Albacore	22,095	35,256	1.60
Bigeye tuna	271,954	925,458	3.40
Kawakawa	1,015	1,274	1.25
Frigate tuna	75	59	0.78
Broadbill swordfish	24,698	60,877	2.46
Blue marlin	117,915	123,014	1.04
Black marlin	944	934	0.99
Striped marlin	44,299	65,619	1.48
Shortnose spearfish	7,047	11,037	1.57
Sailfish	2,533	2,843	1.12
Ocean moonfish	23,089	33,608	1.46
Spiny lobster	29,431	456,127	15.50
Slipper lobster	7,189	69,549	9.67
Crabs	6,585	30,698	4.66
Shrimp (freshwater)	20	105	5.25
Shrimp (saltwater)	24,639	117,040	4.75
Octopus	1,910	4,508	2.36
Squid	6,600	5,529	0.84
Limpets (saltwater)	485	1,390	2.87
Limpets (freshwater)	5	11	2.29
Sea cucumbers	27	165	6.11
Algae	458	1,063	2.32
** SUBTOTAL **	1,233,592	3,405,131	2.76

Table V.1.13

Hawaii November 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	2,050	2,880	1.40
Sharks	12,831	6,484	0.51
Eels	43	45	1.04
Bigeye scad (akule)	39,871	71,146	1.78
Mackerel scad	27,368	44,759	1.64
Leatherback	186	186	1.00
Ten pounder	29	28	0.96
Bonefish	769	867	1.13
Milkfish	251	620	2.47
Threadfin	76	375	4.93
Mullet	432	1,046	2.42
Pomfret	5,046	5,385	1.07
Snake mackerel	4,172	526	0.13
Jacks (misc)	5,271	8,752	1.66
Amberjack	246	193	0.78
Blue crevally	348	747	2.15
Pig-lipped ulua	6,533	9,426	1.44
Dobe ulua	40	42	1.05
Paapaa ulua	609	1,463	2.40
White ulua	1,543	2,560	1.66
Black ulua	50	63	1.27
Giant sea bass	5,657	13,125	2.32
Blue spot grouper	7	16	2.23
Snappers	968	2,500	2.58
Blue lined snapper	4,880	3,105	0.64
Ehu (red snapper)	4,165	13,413	3.22
Gindai (flower snapper)	336	883	2.63
Kalekale (pink snapper)	1,868	4,499	2.41
Lehi (silverjaw)	1,565	4,770	3.05
Onaga (red snapper)	18,090	82,838	4.58
Opakapaka (pink snapper)	22,061	87,062	3.95
Uku (gray snapper)	10,852	35,513	3.27
Porgy	105	215	2.05
Squirrelfish	1,991	6,121	3.07
Trumpetfish	5	4	0.84
Scorpionfish	291	941	3.23
Mountain bass	280	878	3.14
Bigeyes	476	963	2.02
Goatfish	4,235	12,275	2.90
Rudderfish	111	127	1.15
Damselfish	86	117	1.36
Hawkfish	72	160	2.22

Table V.1.13 (Cont.)

Species	Pounds	Value	$/lb
Tilapia	1,265	916	0.72
Wrasse	739	1,703	2.30
Parrotfish	1,555	3,190	2.05
Surgeon/tangs	5,511	6,281	1.14
Flounders	1	2	1.50
Triggerfish	37	39	1.06
Rainbow runner	216	271	1.26
Mahimahi (dolphin)	148,702	208,268	1.40
Barracudas	820	1,196	1.46
Wahoo	11,832	35,358	2.99
Tunas	40	44	1.10
Skipjack tuna	86,839	172,592	1.99
Yellowfin tuna	231,960	542,522	2.34
Albacore	14,784	25,660	1.74
Bigeye tuna	440,702	1,363,228	3.09
Kawakawa	1,137	1,325	1.17
Broadbill swordfish	34,411	87,173	2.53
Blue marlin	57,149	53,551	0.94
Striped marlin	93,245	103,883	1.11
Shortnose spearfish	6,279	7,592	1.21
Sailfish	3,518	4,511	1.28
Ocean moonfish	25,877	21,448	0.83
Spiny lobster	11,743	141,867	12.08
Slipper lobster	2,117	20,788	9.82
Crabs	5,321	25,991	4.88
Shrimp (freshwater)	10	50	5.00
Shrimp (saltwater)	175	1,224	6.99
Octopus	1,036	2,734	2.64
Squid	3,591	3,144	0.88
Limpets (saltwater)	465	1,227	2.64
Precious corals	400	6,000	15.00
Sea cucumbers	40	211	5.27
Algae	214	650	3.04
** SUBTOTAL **	1,377,596	3,271,754	2.37

Table V.1.14

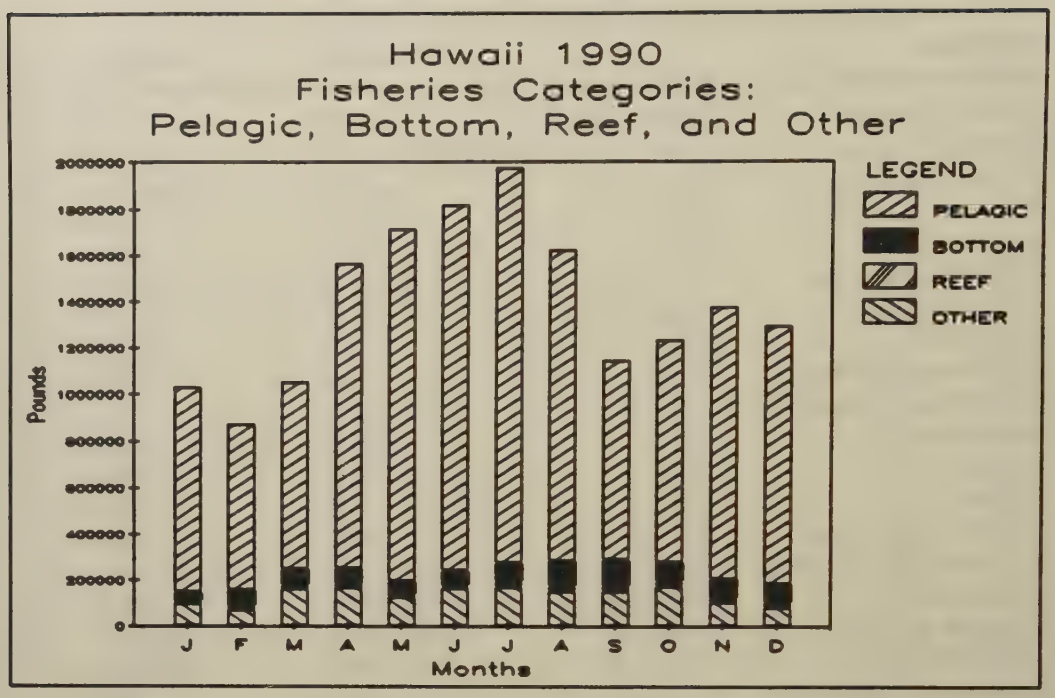
Hawaii December 1990 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	2,760	4,335	1.57
Sharks	11,699	6,697	0.57
Eels	25	16	0.64
Bigeye scad (akule)	29,613	56,427	1.91
Mackerel scad	15,528	27,152	1.75
Leatherback	20	22	1.12
Ten pounder	153	152	0.99
Bonefish	332	293	0.88
Herring/sardine	1	0	0.10
Milkfish	369	703	1.90
Halfbeaks	11	21	1.91
Threadfin	140	744	5.31
Mullet	240	681	2.84
Pomfret	5,805	12,177	2.10
Snake mackerel	3,607	1,238	0.34
Jacks (misc)	5,866	11,922	2.03
Amberjack	570	481	0.84
Blue crevally	439	1,210	2.76
Pig-lipped ulua	5,520	13,898	2.52
Dobe ulua	1	1	1.35
Paapaa ulua	793	2,682	3.38
White ulua	2,779	5,566	2.00
Black ulua	156	322	2.06
Giant sea bass	3,831	12,824	3.35
Blue spot grouper	30	80	2.67
Snappers	131	526	4.01
Blue lined snapper	3,637	2,819	0.78
Ehu (red snapper)	7,097	38,462	5.42
Gindai (flower snapper)	508	1,621	3.19
Kalekale (pink snapper)	2,287	6,312	2.76
Lehi (silverjaw)	1,562	5,108	3.27
Onaga (red snapper)	18,314	116,796	6.38
Opakapaka (pink snapper)	18,103	97,685	5.40
Uku (gray snapper)	10,026	41,791	4.17
Porgy	213	458	2.15
Squirrelfish	3,175	10,347	3.26
Trumpetfish	5	3	0.50
Scorpionfish	358	1,520	4.25
Mountain bass	384	1,408	3.67
Bigeyes	521	979	1.88
Goatfish	6,356	17,691	2.78
Rudderfish	319	348	1.09

Table V.1.14 (Cont.)

Species	Pounds	Value	$/lb
Damselfish	104	128	1.23
Hawkfish	8	15	1.84
Tilapia	1,319	1,142	0.87
Wrasse	741	1,759	2.37
Parrotfish	1,641	3,427	2.09
Surgeon/tangs	4,831	4,945	1.02
Flounders	1	1	0.50
Filefish	37	124	3.35
Rainbow runner	176	264	1.50
Mahimahi (dolphin)	68,159	136,649	2.00
Barracudas	519	939	1.81
Wahoo	8,616	31,582	3.67
Tunas	92	279	3.04
Skipjack tuna	30,980	60,262	1.95
Yellowfin tuna	183,350	527,145	2.88
Albacore	44,876	87,898	1.96
Bigeye tuna	490,695	1,977,000	4.03
Kawakawa	889	1,083	1.22
Frigate tuna	37	58	1.56
Broadbill swordfish	99,894	369,357	3.70
Blue marlin	39,164	52,957	1.35
Black marlin	463	1,473	3.18
Striped marlin	99,891	160,989	1.61
Shortnose spearfish	10,923	13,697	1.25
Sailfish	75	101	1.35
Ocean moonfish	20,366	22,518	1.11
Spiny lobster	628	4,058	6.46
Slipper lobster	30	300	10.00
Crabs	3,078	12,493	4.06
Shrimp (freshwater)	8	40	5.00
Shrimp (saltwater)	17,939	76,402	4.26
Octopus	644	1,731	2.69
Squid	2,234	1,611	0.72
Limpets (saltwater)	554	1,754	3.17
Sea cucumbers	9	75	8.38
Algae	234	722	3.08
** SUBTOTAL **	1,296,489	4,058,494	3.13
** TOTAL **	16,728,129	44,097,981	2.64

Figure V.1.1



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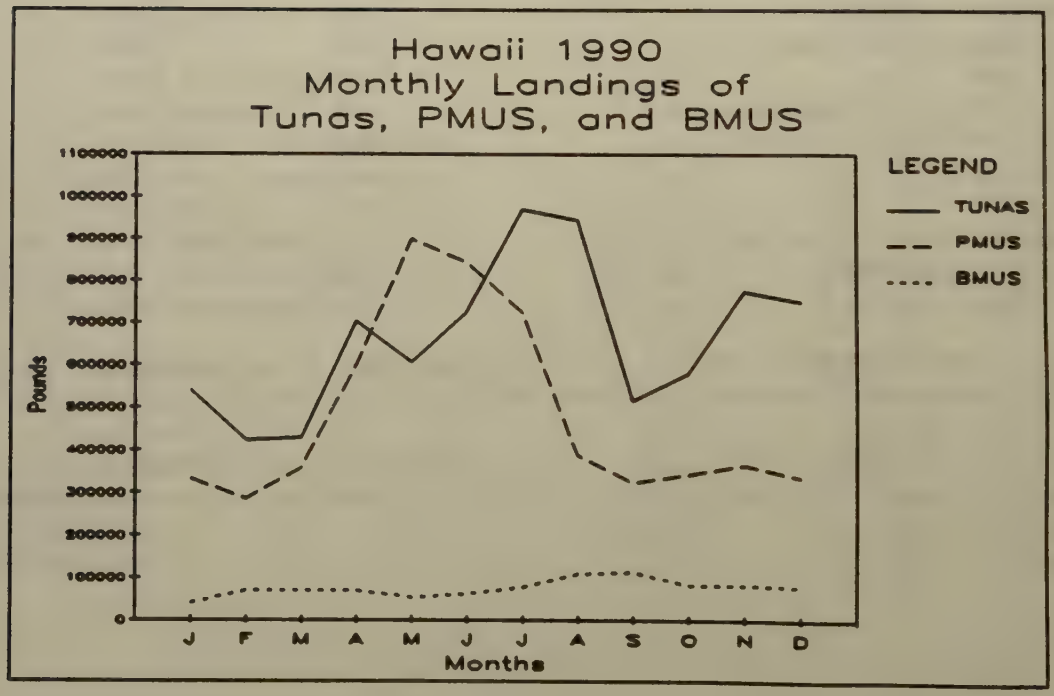

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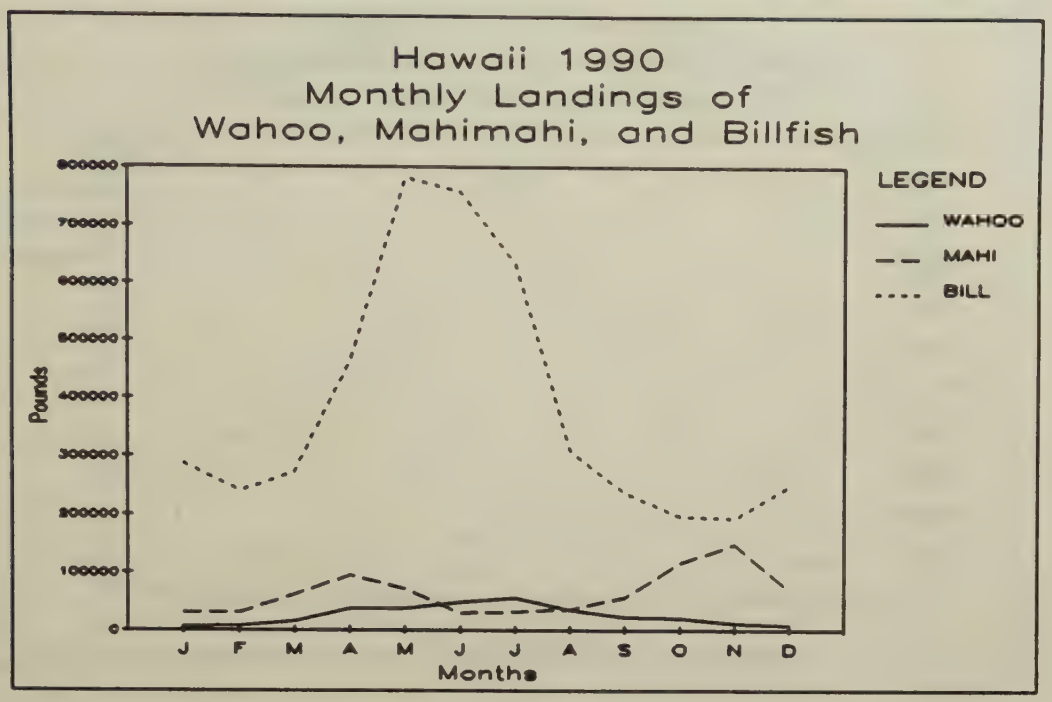

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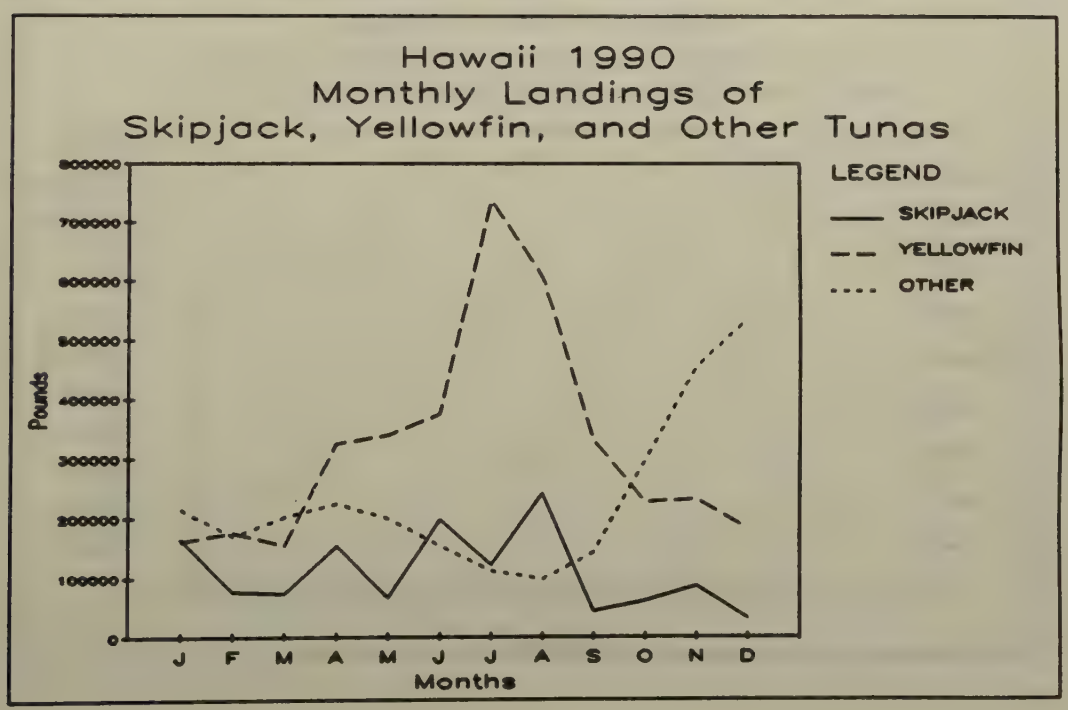

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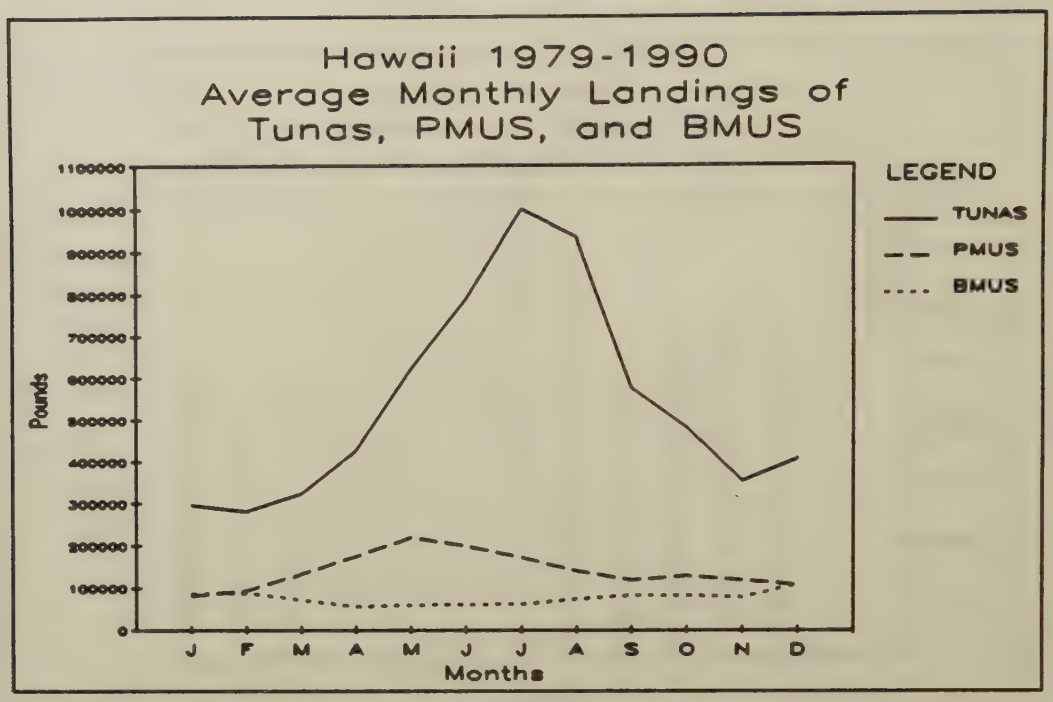

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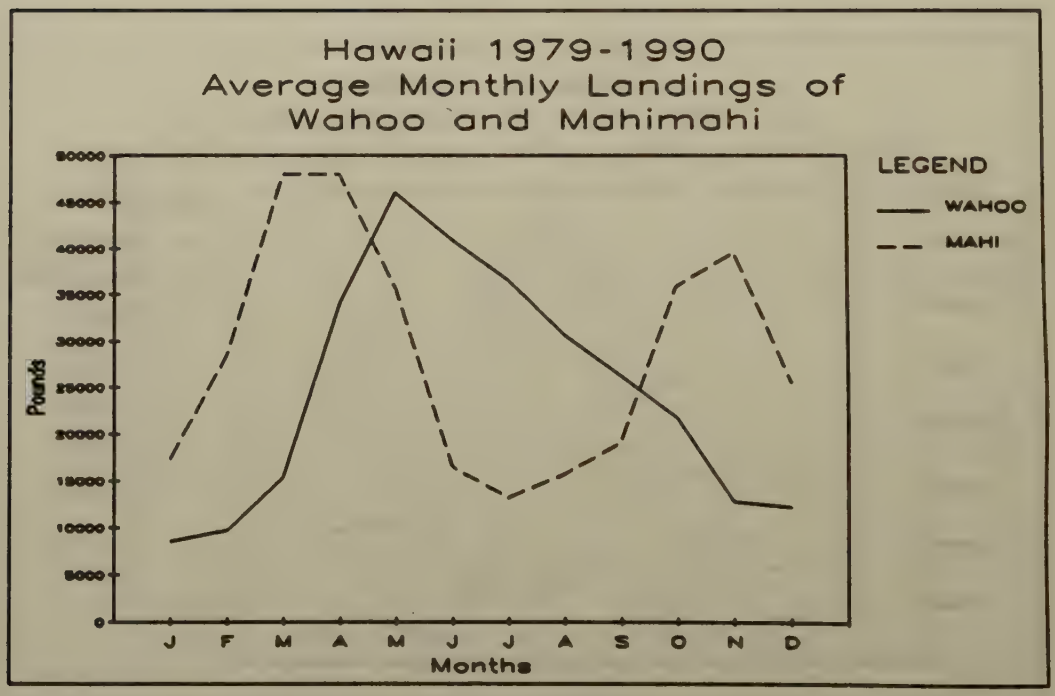

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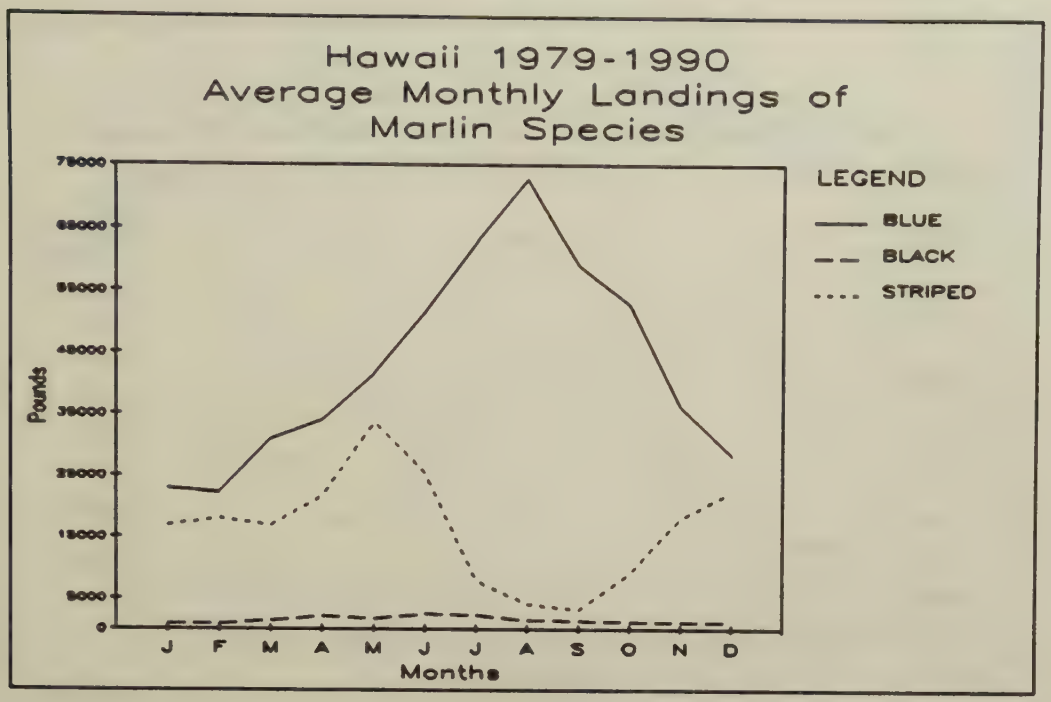

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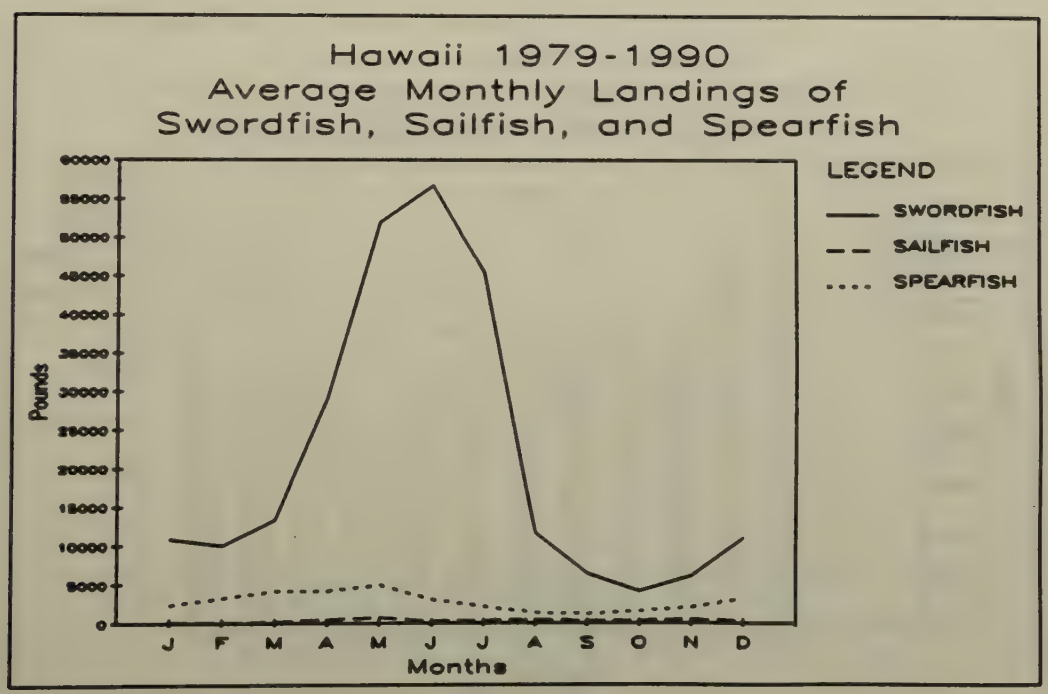

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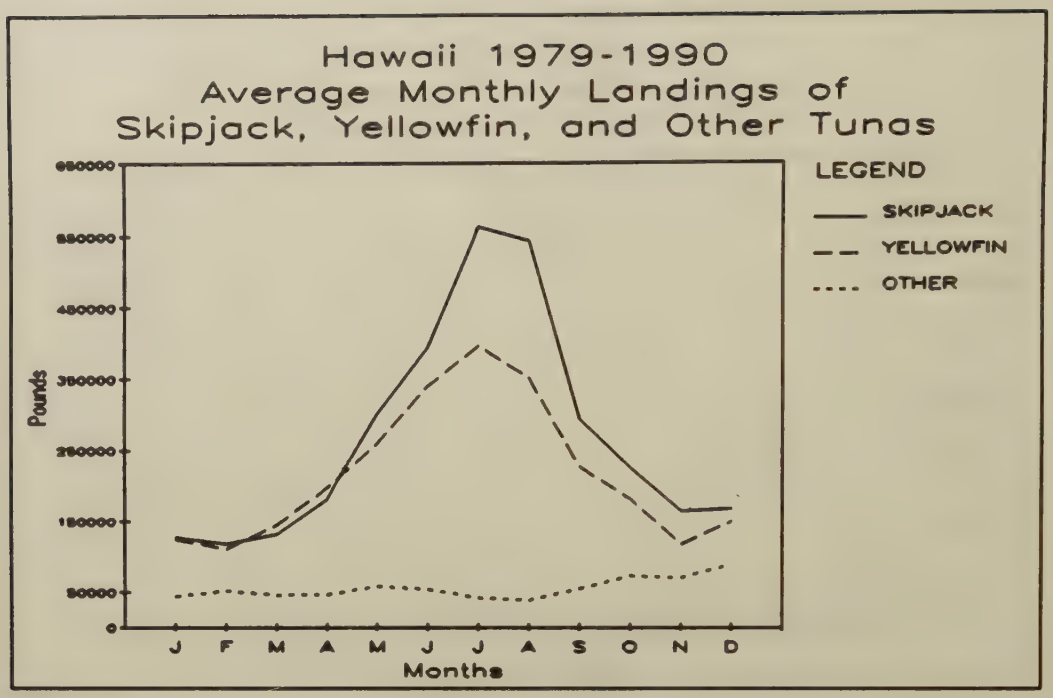

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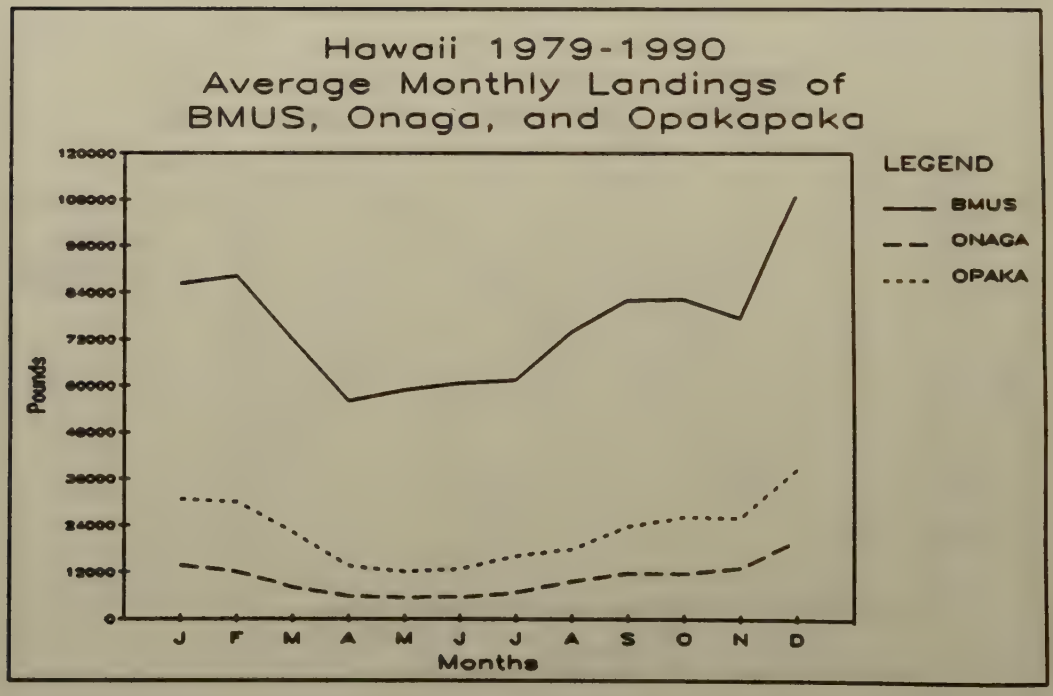

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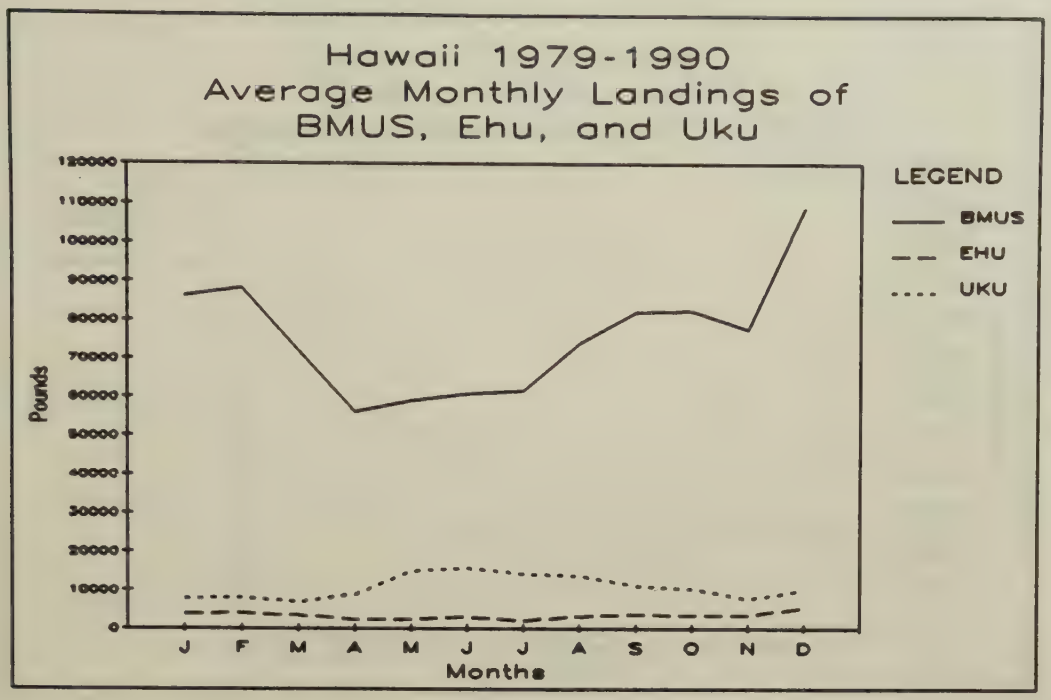

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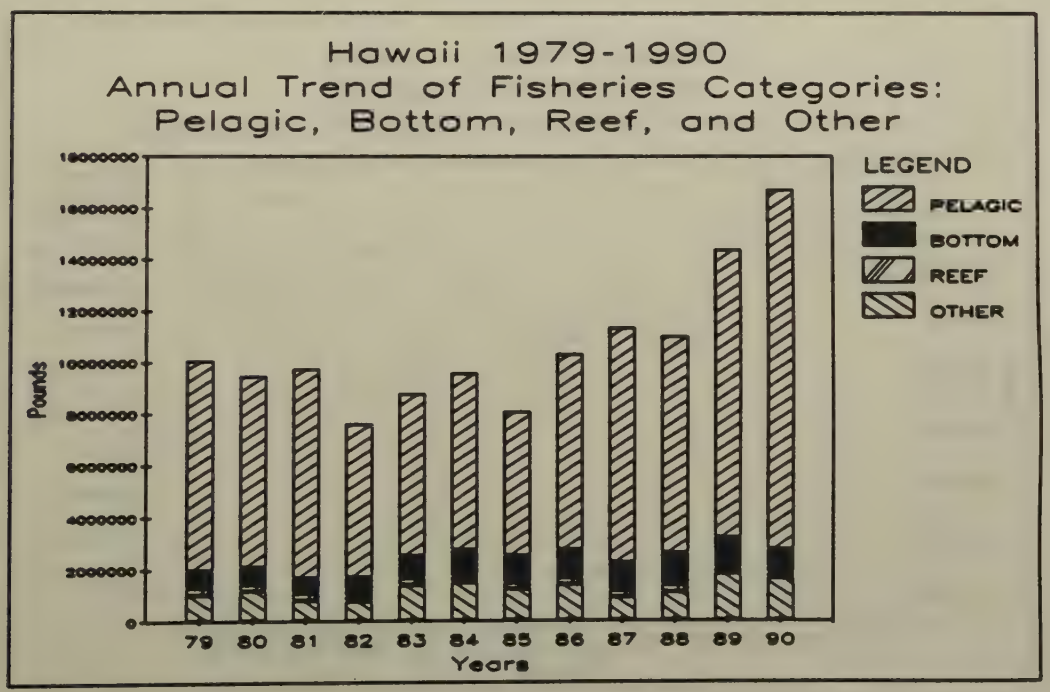

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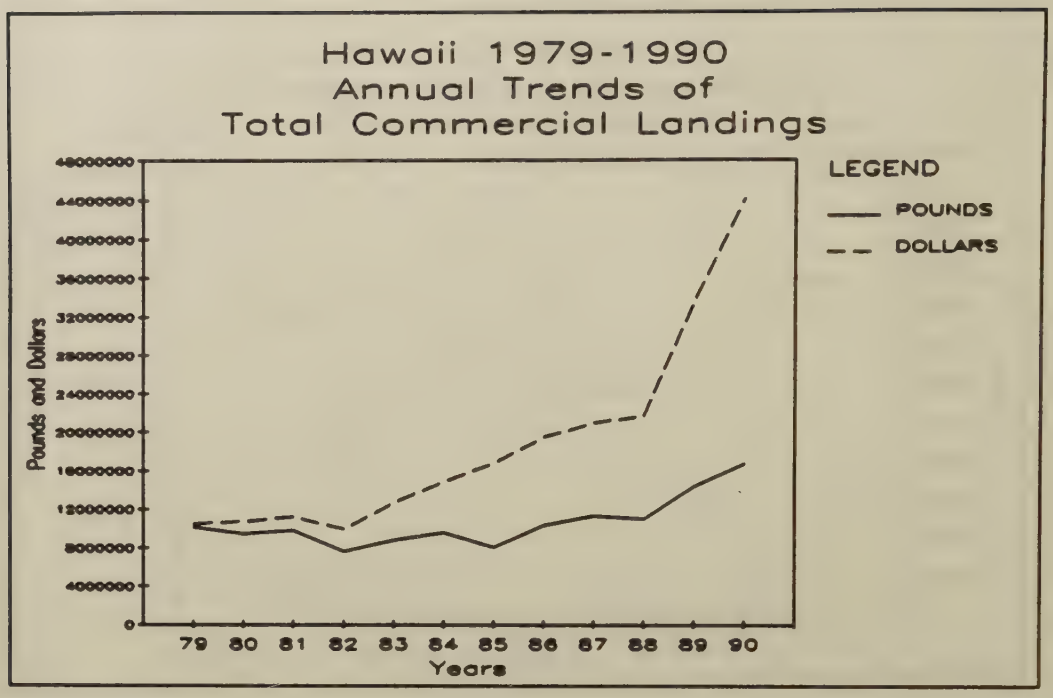

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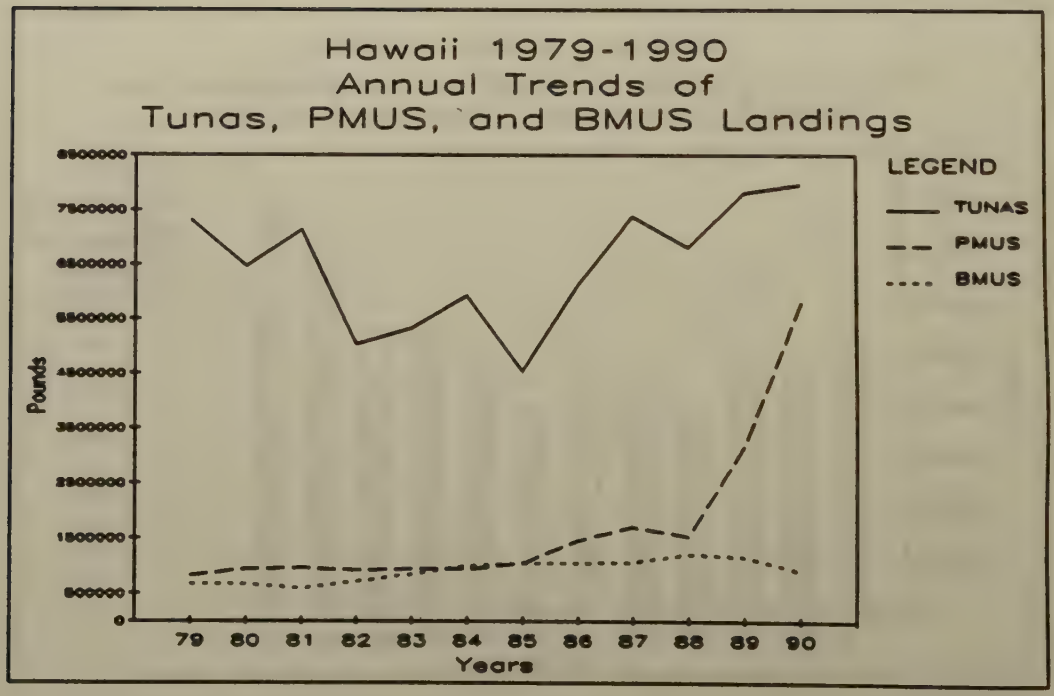

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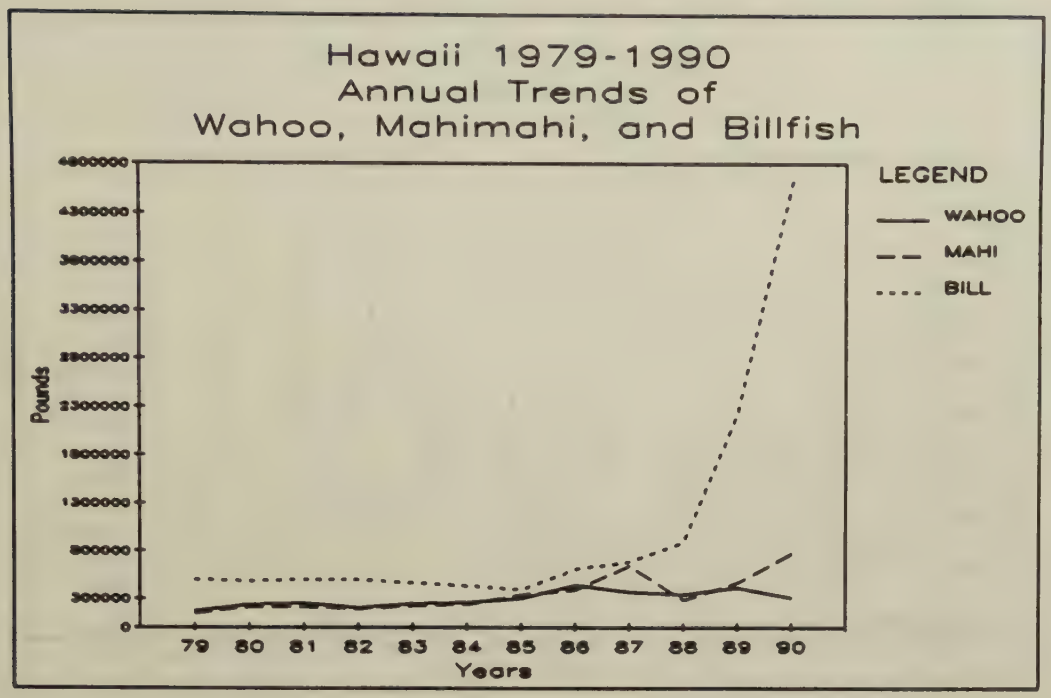

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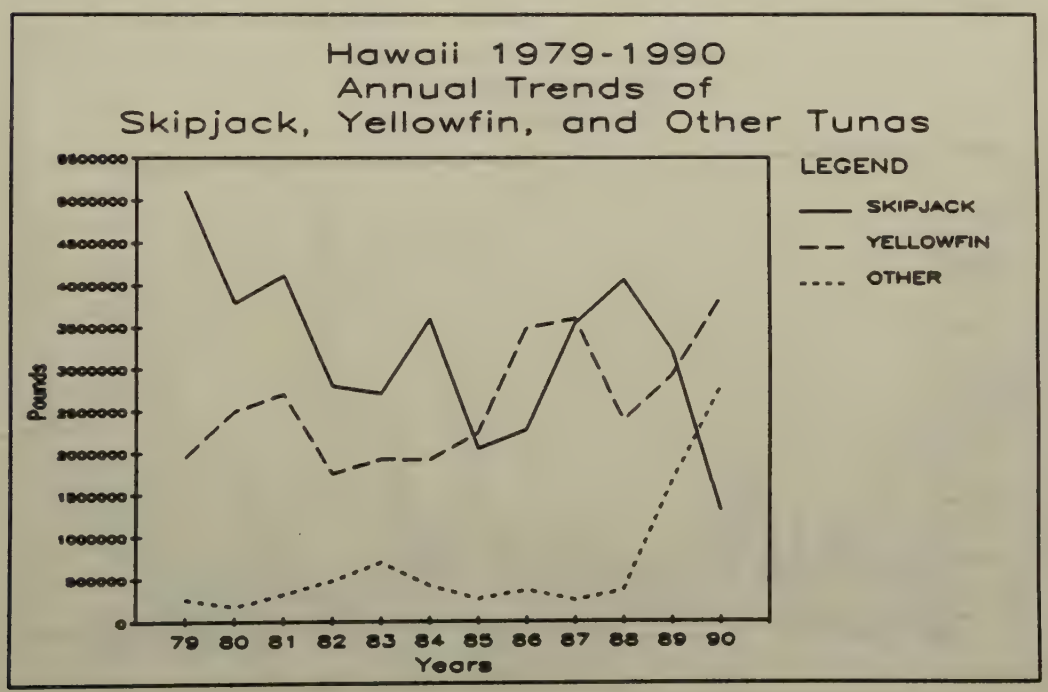

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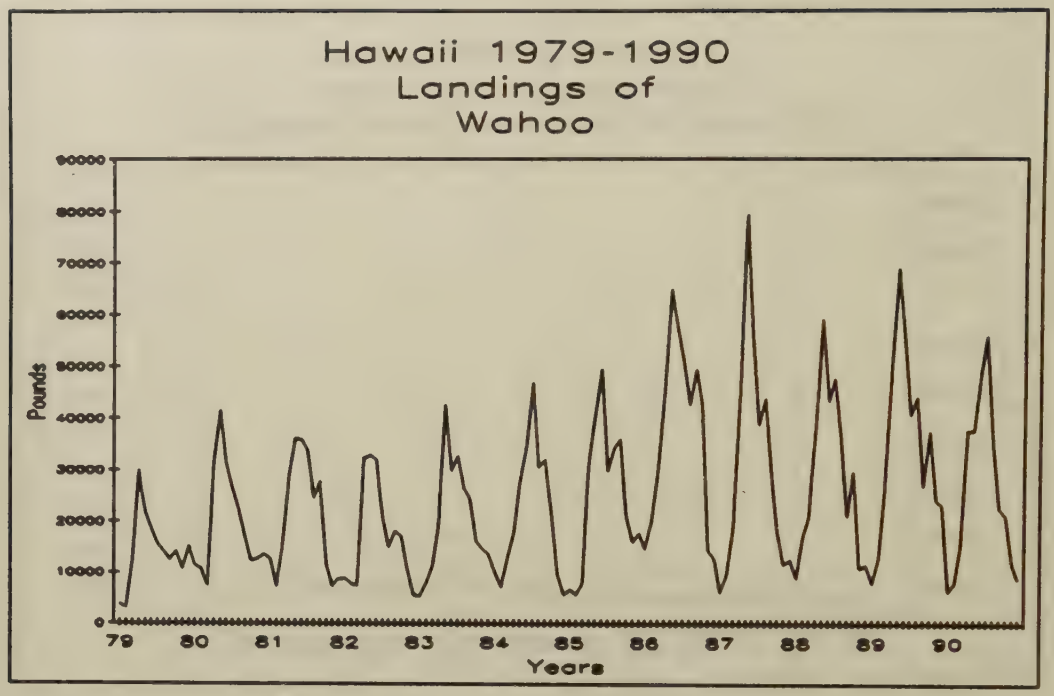

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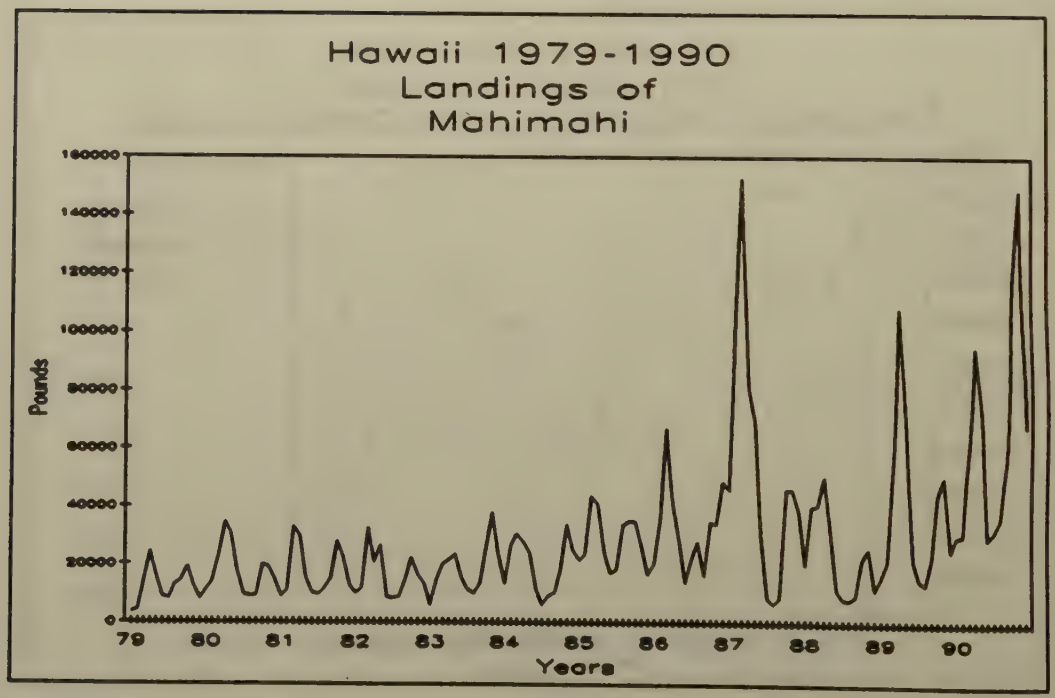

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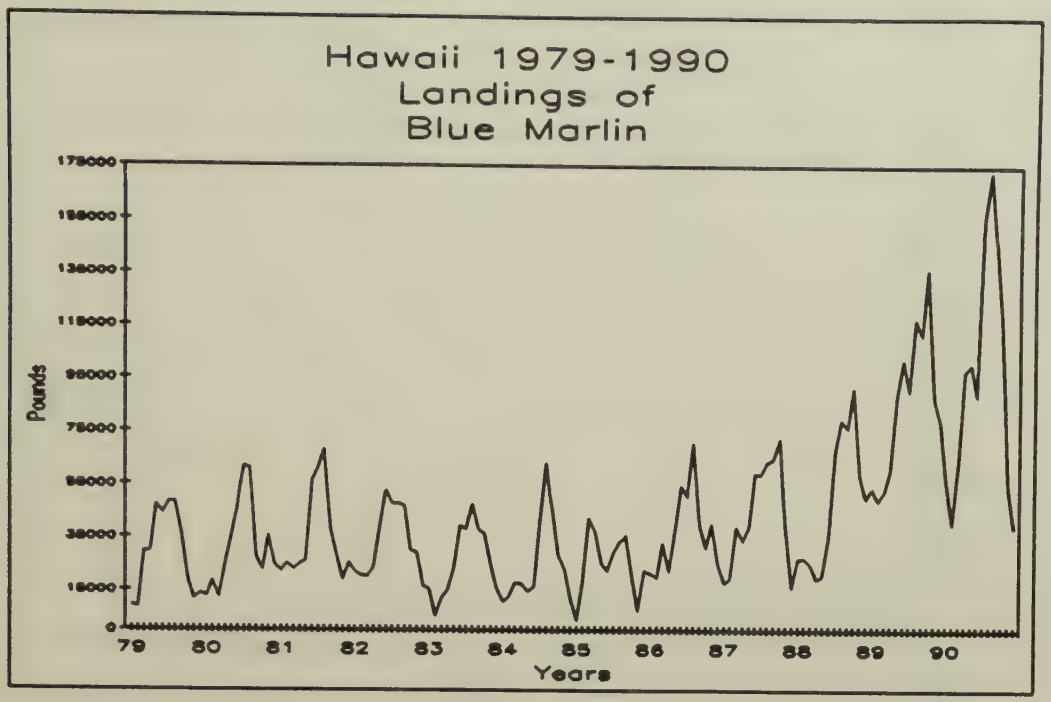

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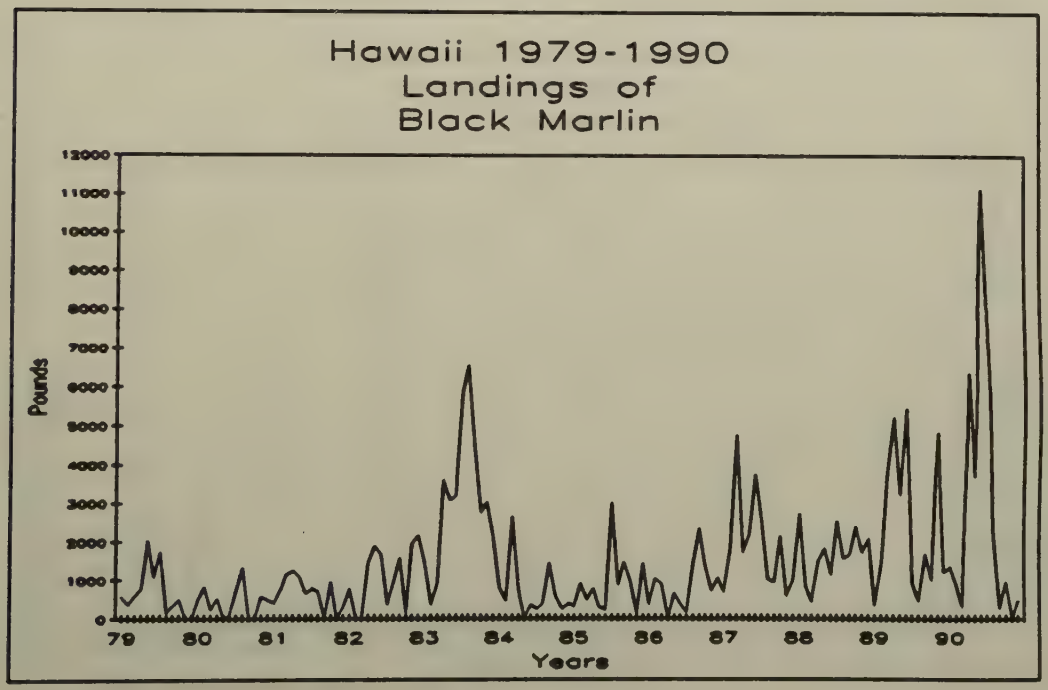

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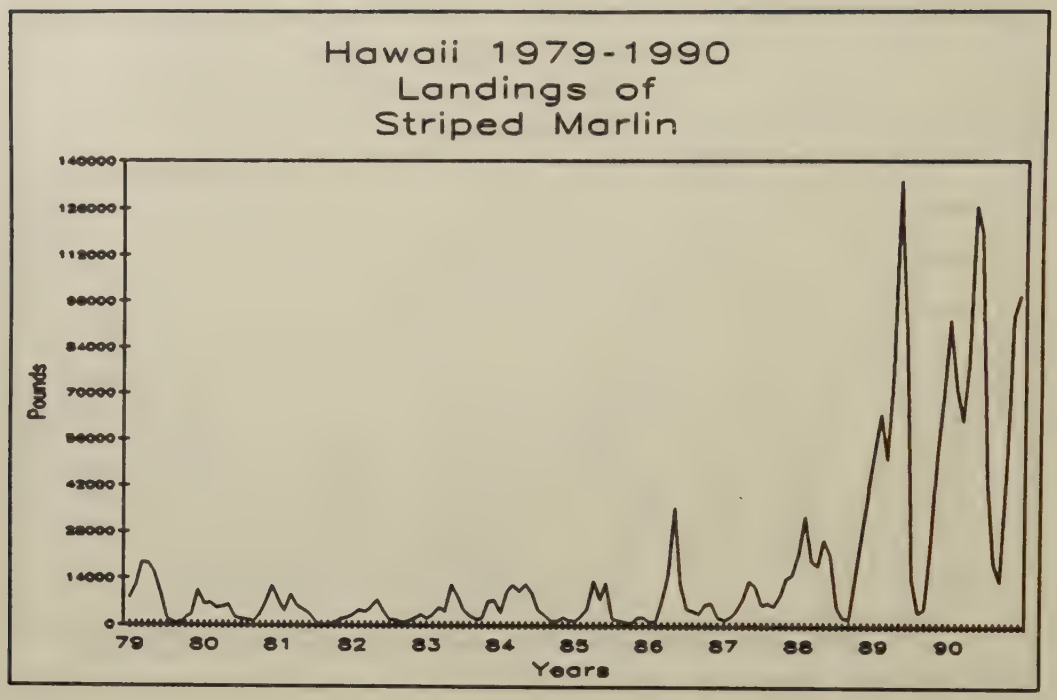

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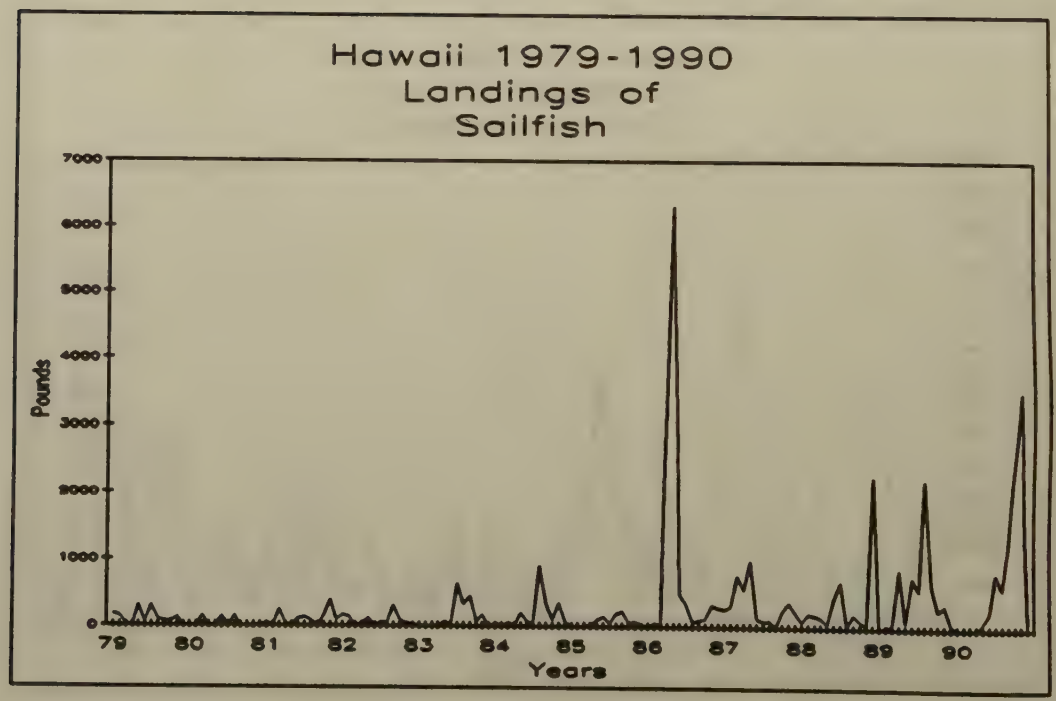

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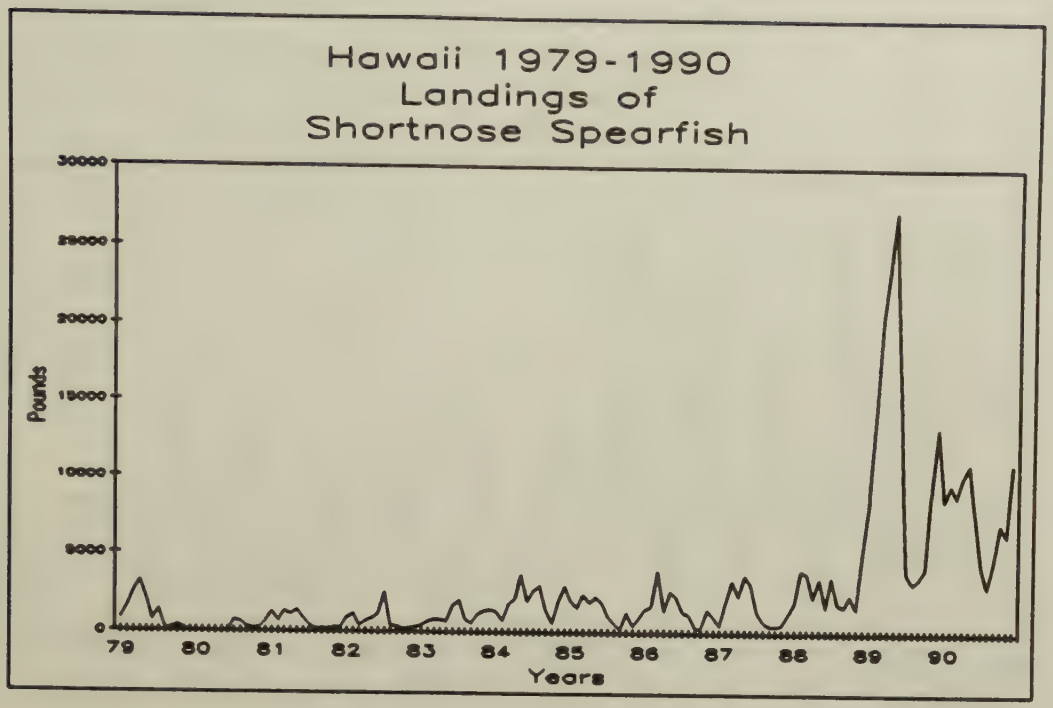

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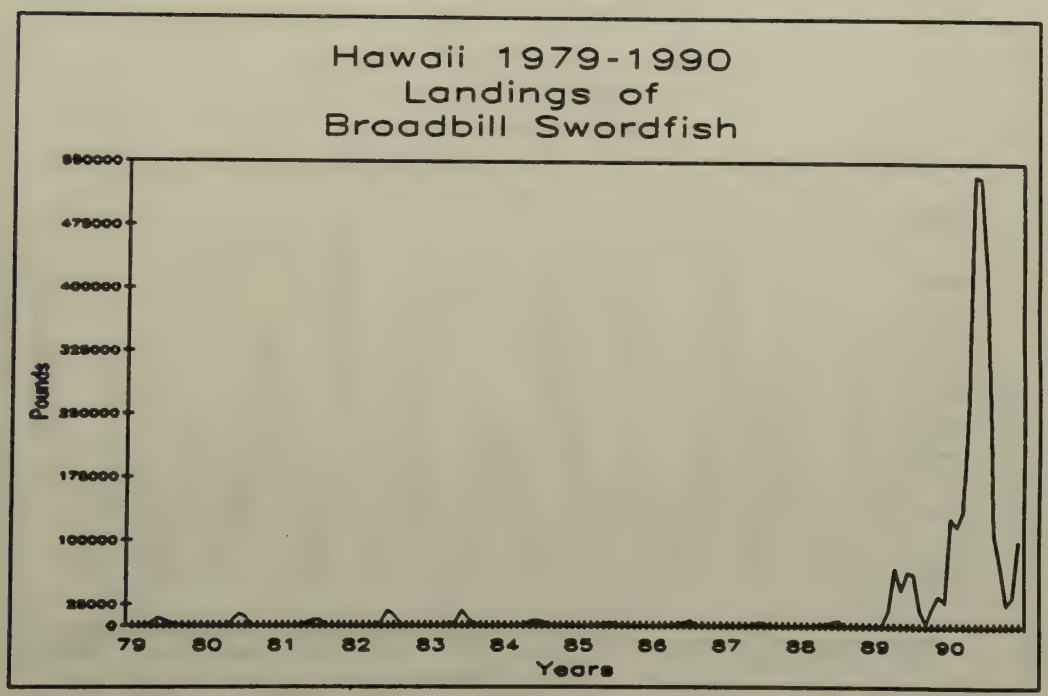

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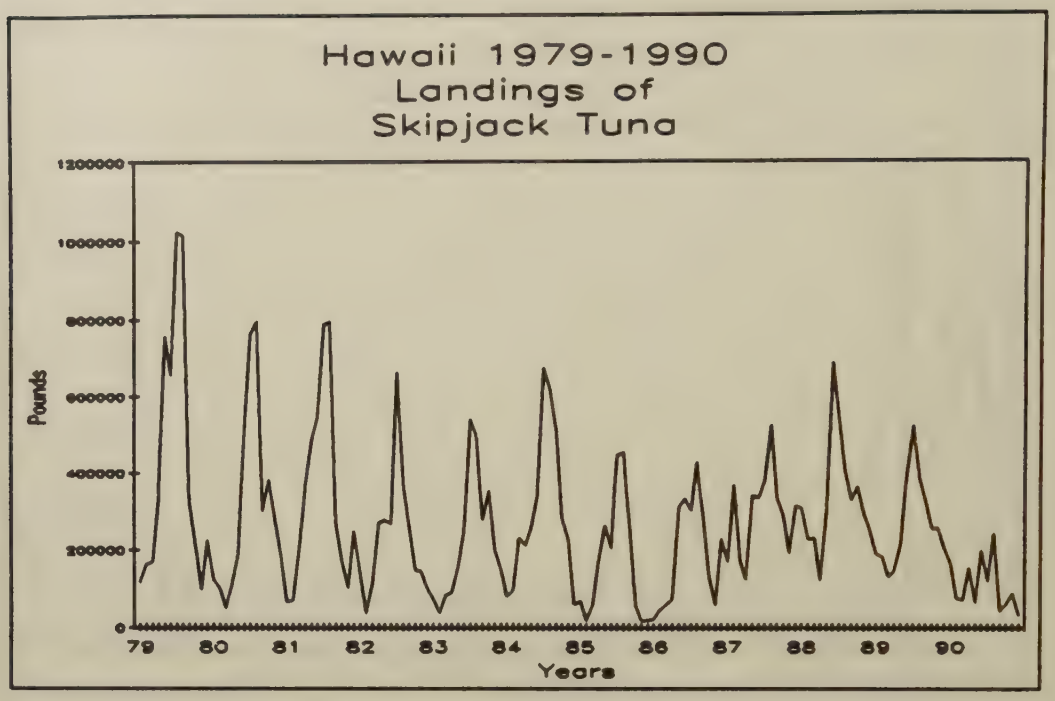

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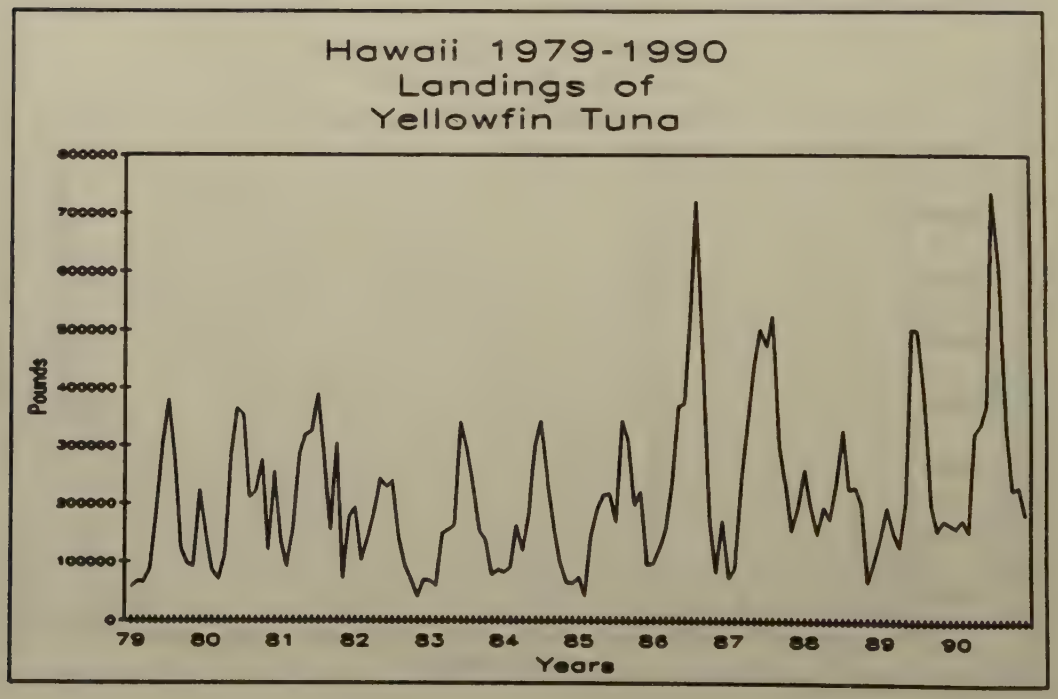

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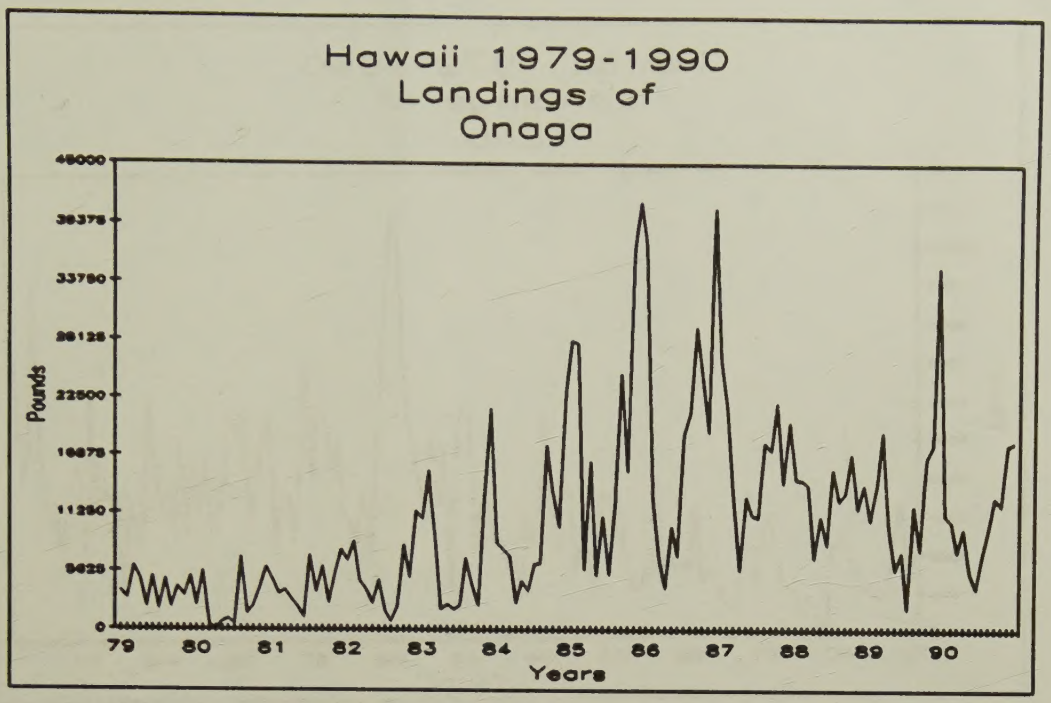

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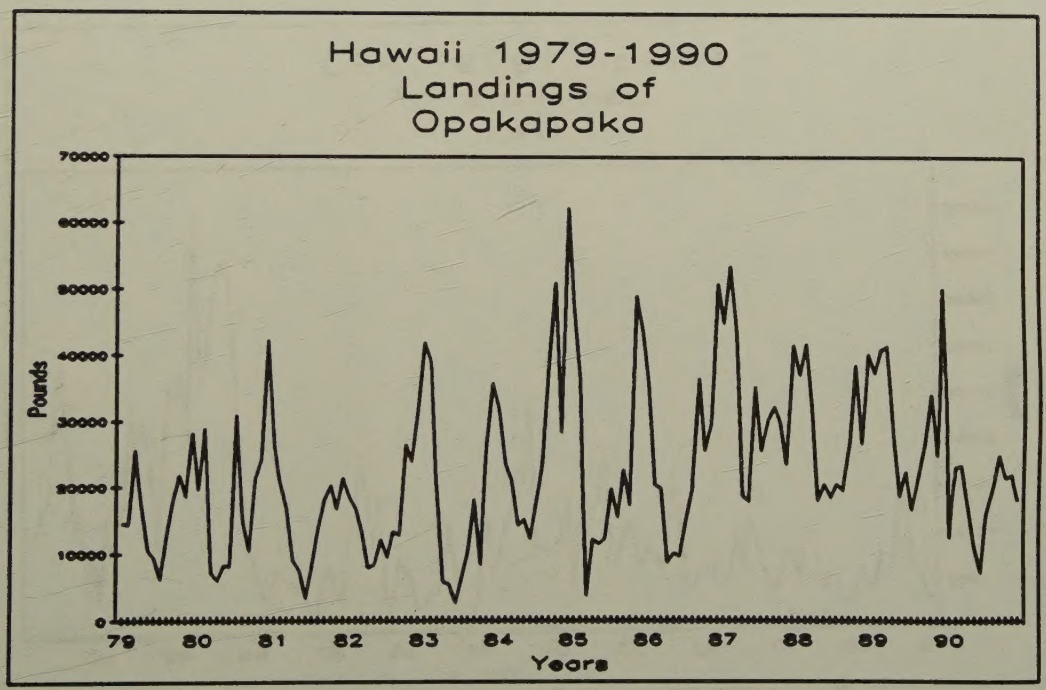

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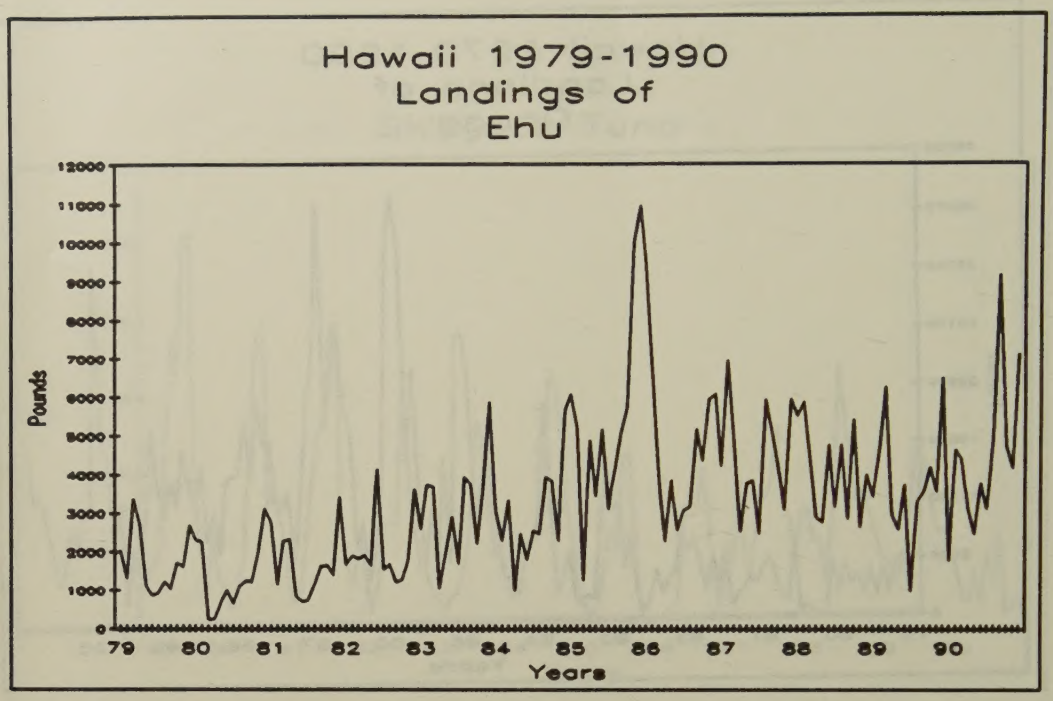

Figure V.4.14